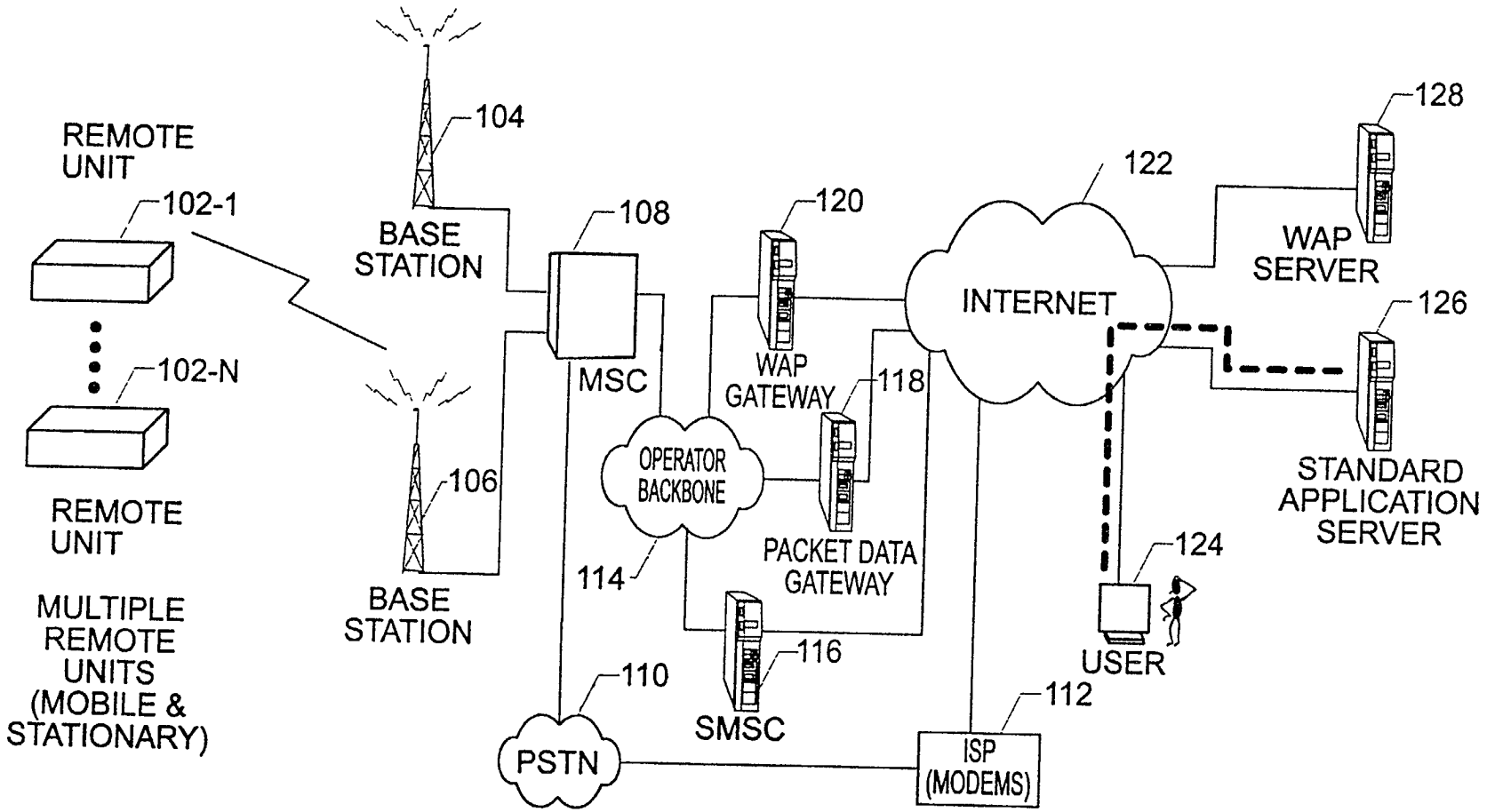
REMOTE UNIT
102-1
102-N
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)
104
BASE STATION
106
BASE STATION
108
MSC
114
OPERATOR BACKBONE
110
PSTN
120
WAP GATEWAY
118
PACKET DATA GATEWAY
116
SMSC
122
INTERNET
112
ISP (MODEMS)
128
WAP SERVER
126
STANDARD APPLICATION SERVER
124
USER

FIG. 1a

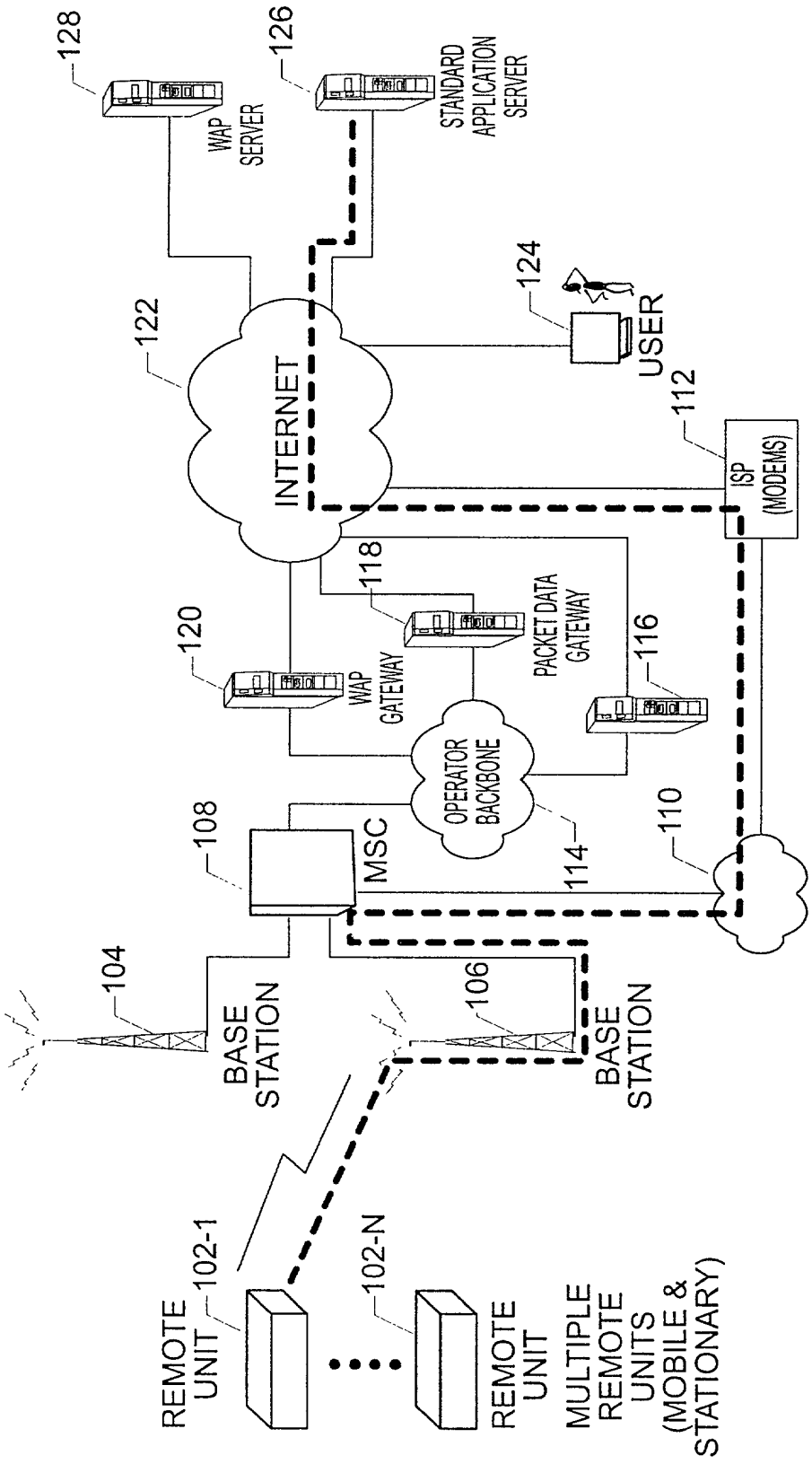
128
WAP SERVER
126
STANDARD APPLICATION SERVER
124
USER
122
INTERNET
112
ISP (MODEMS)
118
PACKET DATA GATEWAY
120
WAP GATEWAY
116
OPERATOR BACKBONE
108
MSC
114
110
104
BASE STATION
106
BASE STATION
REMOTE UNIT
102-1
102-N
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)

FIG. 1b

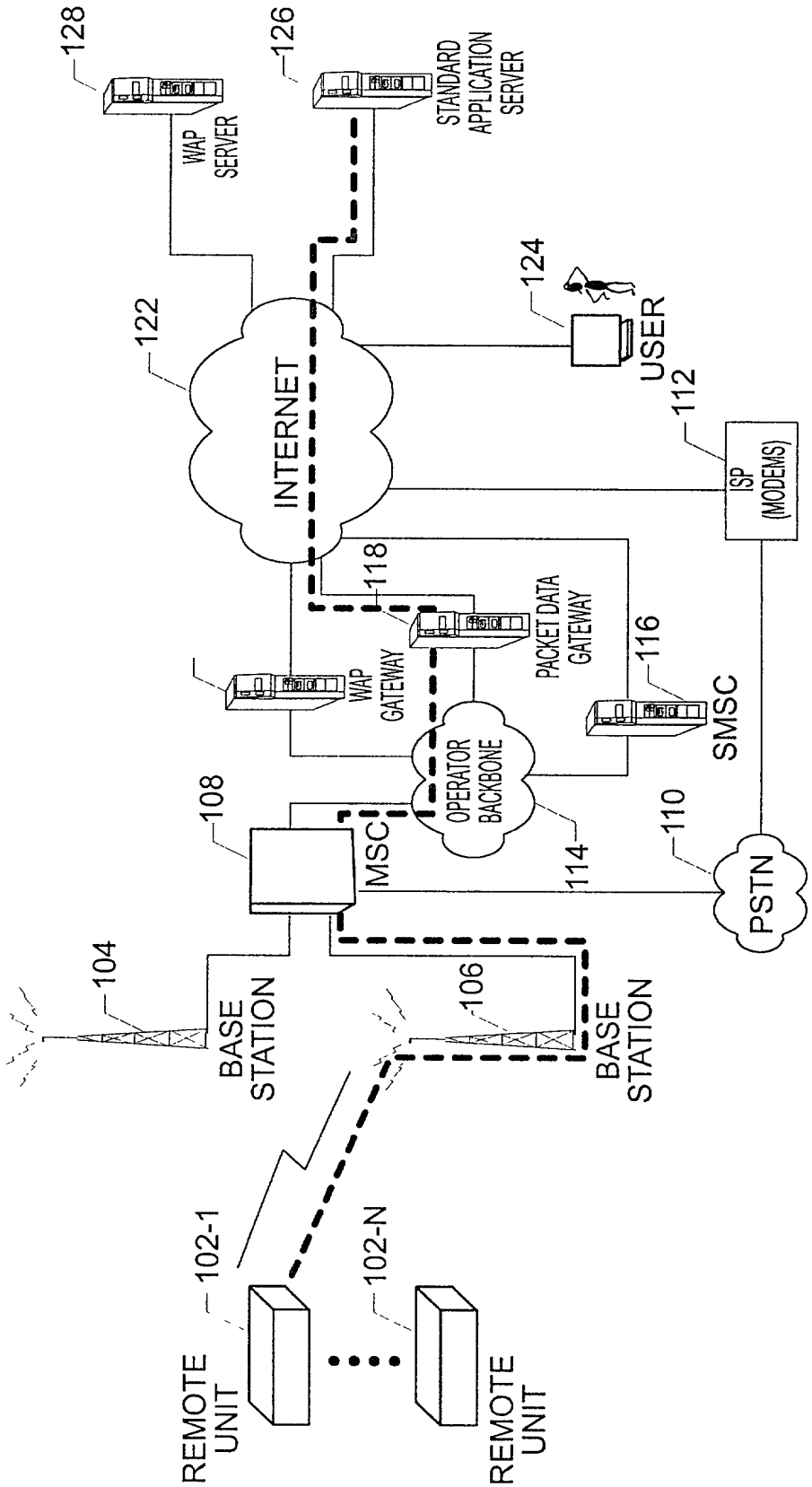
128
WAP SERVER
126
STANDARD APPLICATION SERVER
122
INTERNET
124
USER
112
ISP (MODEMS)
118
PACKET DATA GATEWAY
WAP GATEWAY
116
SMSC
OPERATOR BACKBONE
108
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
102-N
REMOTE UNIT
REMOTE UNIT

FIG. 1c

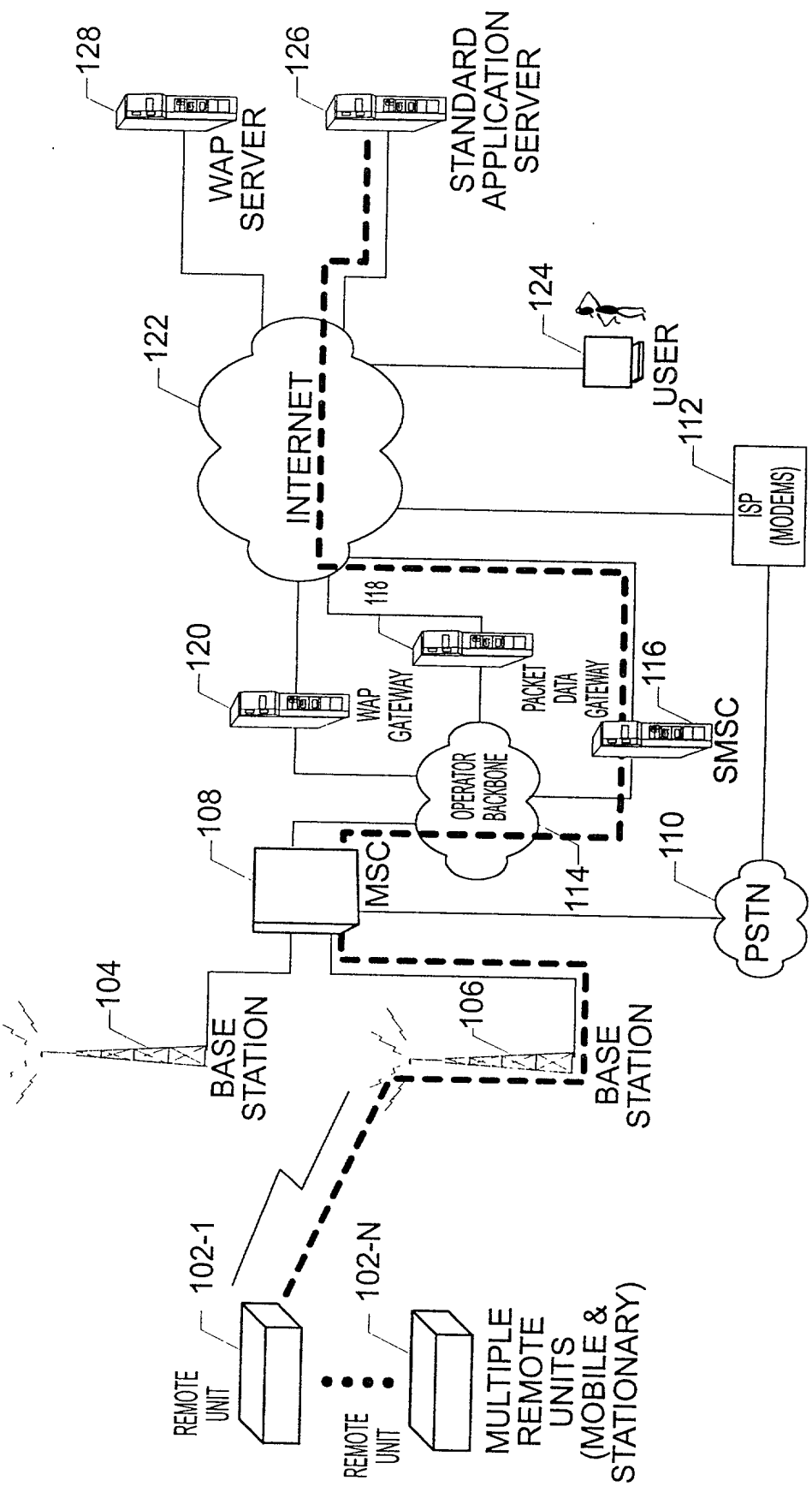
128
WAP SERVER
126
STANDARD APPLICATION SERVER
122
INTERNET
124
USER
112
ISP (MODEMS)
118
120
WAP GATEWAY
PACKET DATA GATEWAY
116
SMSC
OPERATOR BACKBONE
108
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
REMOTE UNIT
102-N
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)

FIG. 1d

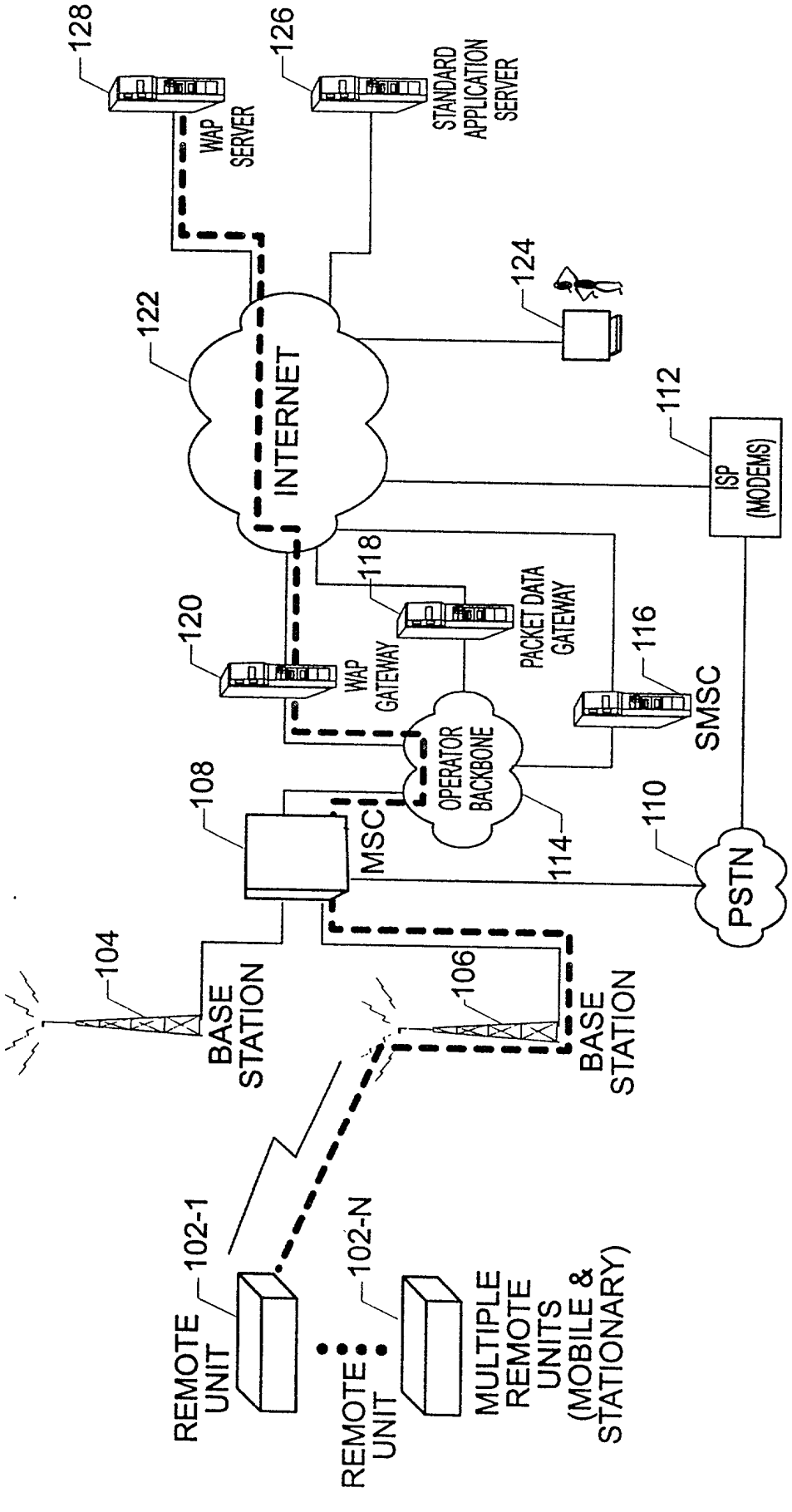
128
WAP SERVER
126
STANDARD APPLICATION SERVER
124
122
INTERNET
112
ISP (MODEMS)
118
PACKET DATA GATEWAY
120
WAP GATEWAY
116
SMSC
OPERATOR BACKBONE
108
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
REMOTE UNIT
102-N
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)

FIG. 1e

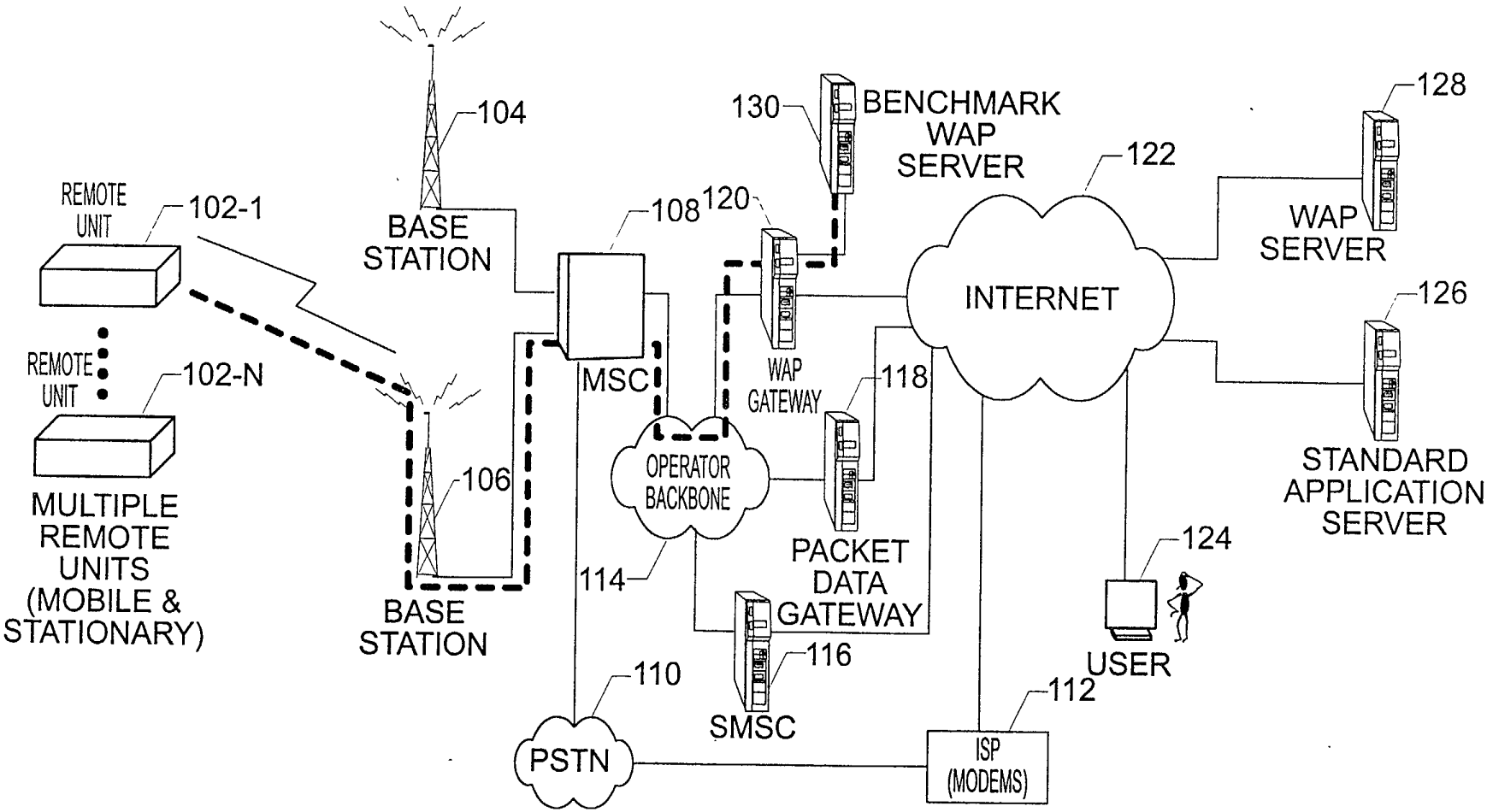
REMOTE UNIT
102-1
REMOTE UNIT
102-N
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)
BASE STATION
104
BASE STATION
106
108
MSC
130
BENCHMARK WAP SERVER
120
WAP GATEWAY
122
INTERNET
128
WAP SERVER
126
STANDARD APPLICATION SERVER
118
OPERATOR BACKBONE
PACKET DATA GATEWAY
114
116
SMSC
110
PSTN
112
ISP (MODEMS)
124
USER

FIG. 1f

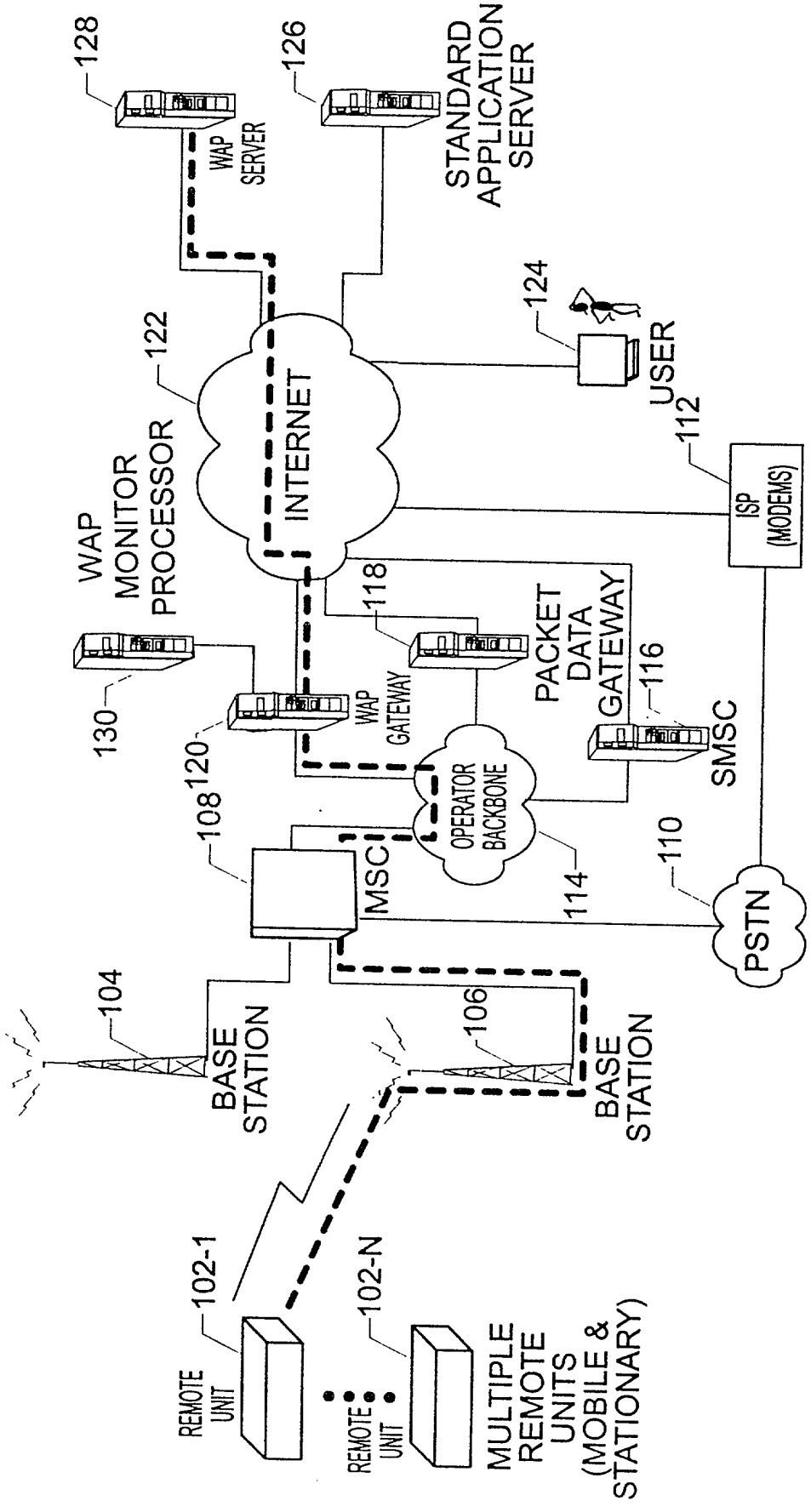
128
WAP SERVER
126
STANDARD APPLICATION SERVER
124
USER
112
122
INTERNET
WAP MONITOR PROCESSOR
ISP (MODEMS)
118
PACKET DATA GATEWAY
116
130
120
WAP GATEWAY
SMSC
108
OPERATOR BACKBONE
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
REMOTE UNIT
102-N
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)

FIG. 1g

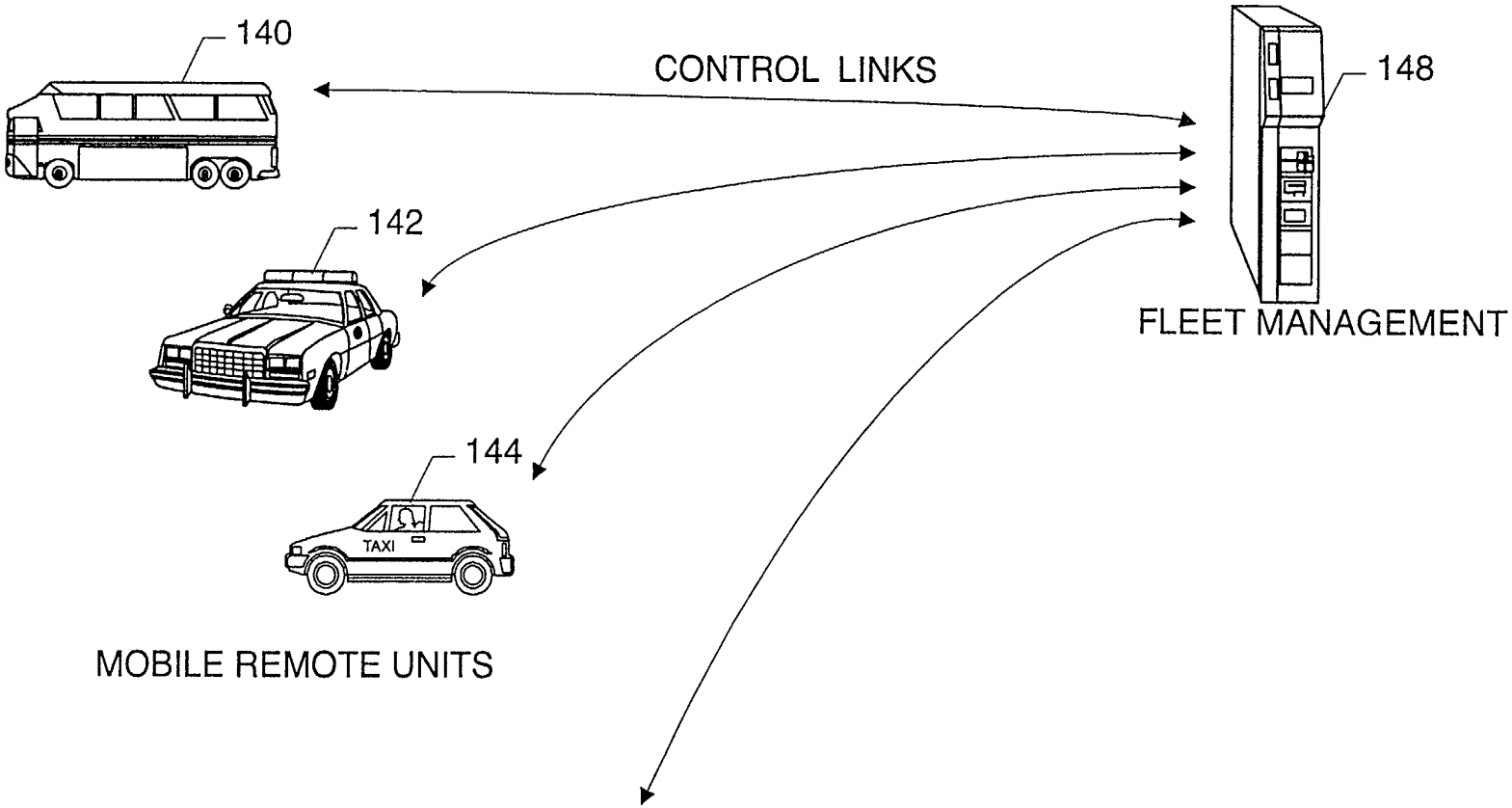
140
CONTROL LINKS
148
142
FLEET MANAGEMENT
144
TAXI
MOBILE REMOTE UNITS
146
STATIONARY REMOTE UNITS

FIG. 1h

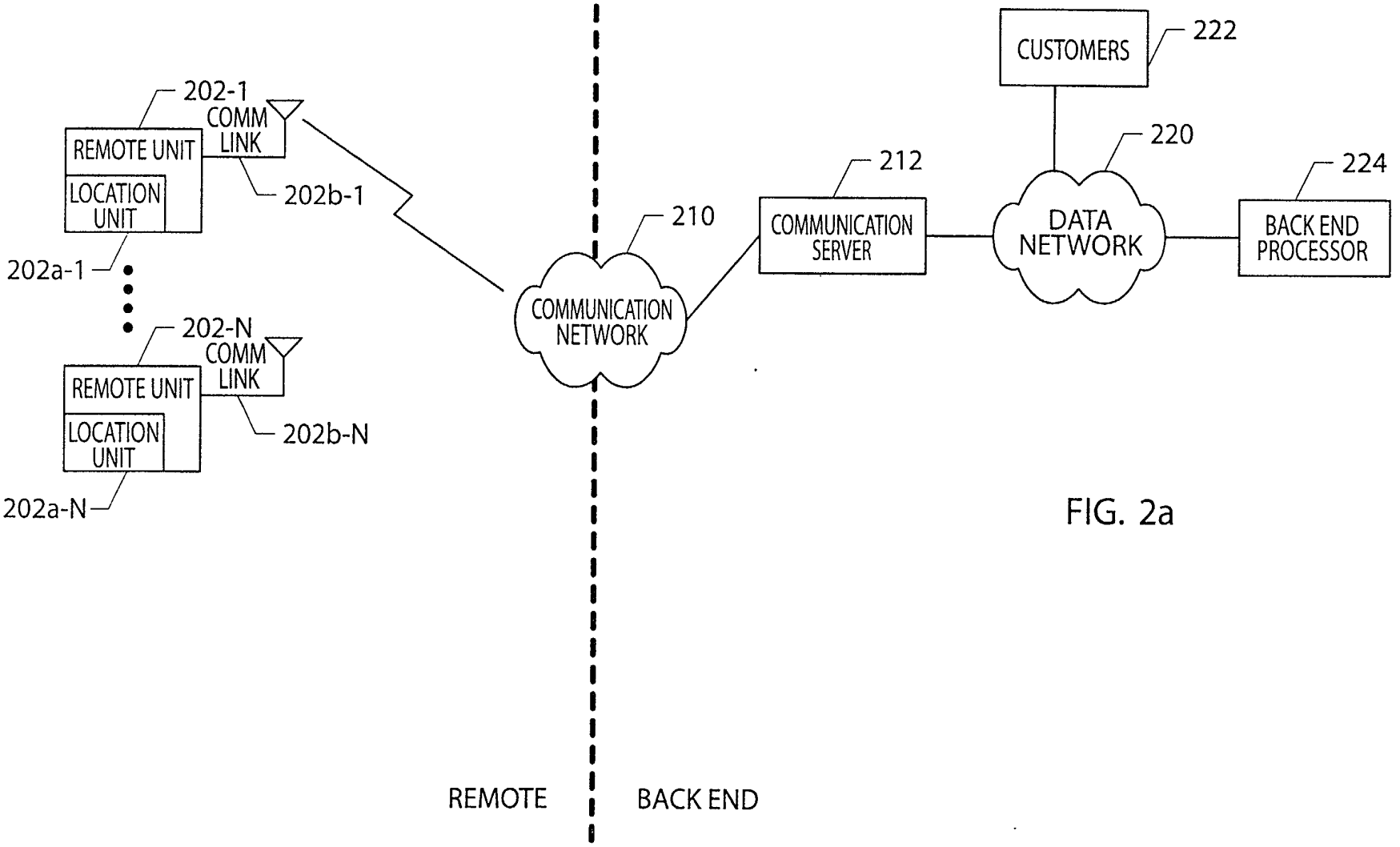
202-1
COMM LINK
REMOTE UNIT
LOCATION UNIT
202b-1
202a-1
202-N
COMM LINK
REMOTE UNIT
LOCATION UNIT
202b-N
202a-N
COMMUNICATION NETWORK
210
COMMUNICATION SERVER
212
CUSTOMERS
222
DATA NETWORK
220
BACK END PROCESSOR
224
REMOTE
BACK END

FIG. 2a

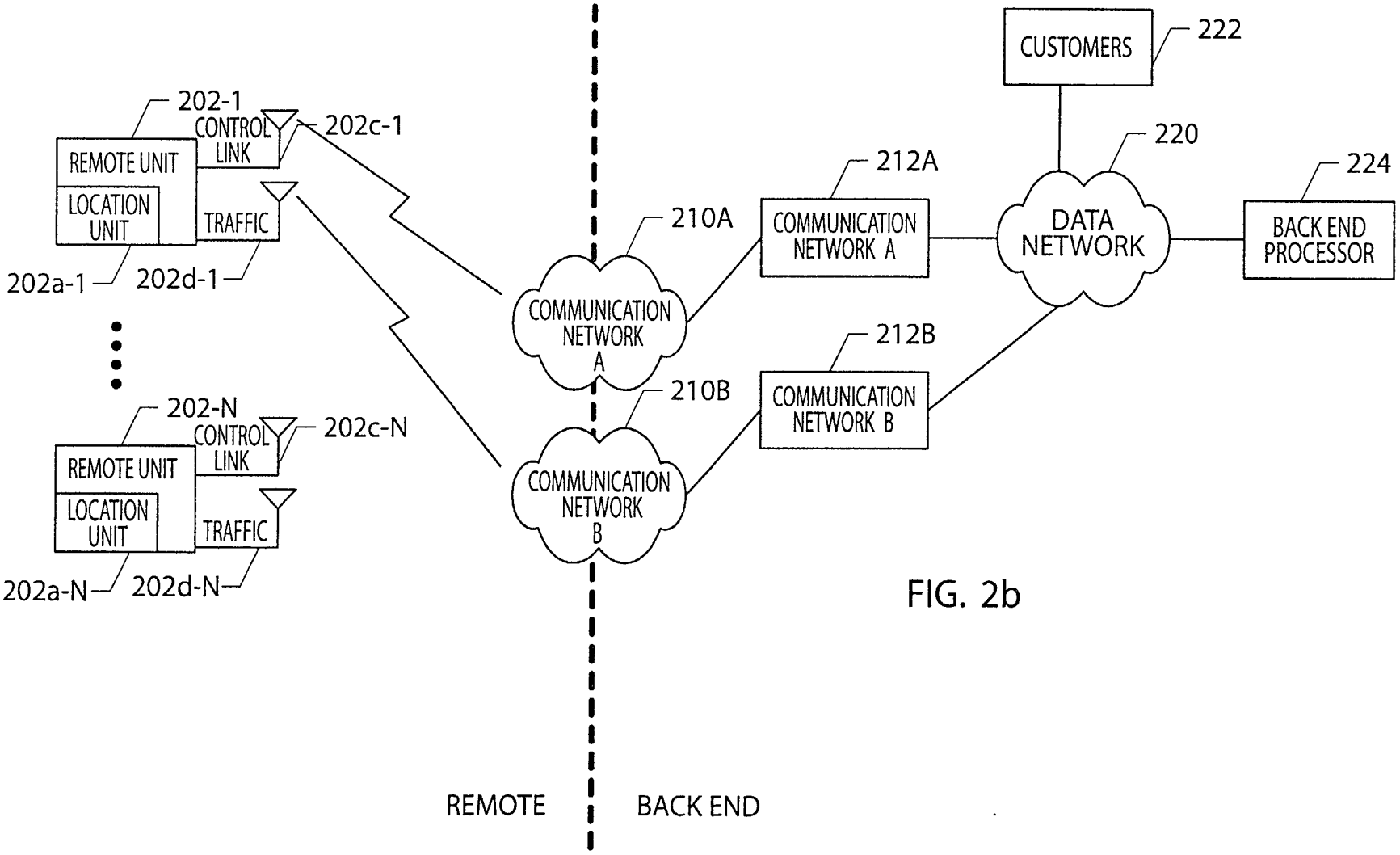
202-1
CONTROL LINK
202c-1
REMOTE UNIT
LOCATION UNIT
TRAFFIC
202a-1
202d-1
202-N
CONTROL LINK
202c-N
REMOTE UNIT
LOCATION UNIT
TRAFFIC
202a-N
202d-N
210A
COMMUNICATION NETWORK A
210B
COMMUNICATION NETWORK B
212A
COMMUNICATION NETWORK A
212B
COMMUNICATION NETWORK B
CUSTOMERS
222
220
DATA NETWORK
224
BACK END PROCESSOR
REMOTE
BACK END

FIG. 2b

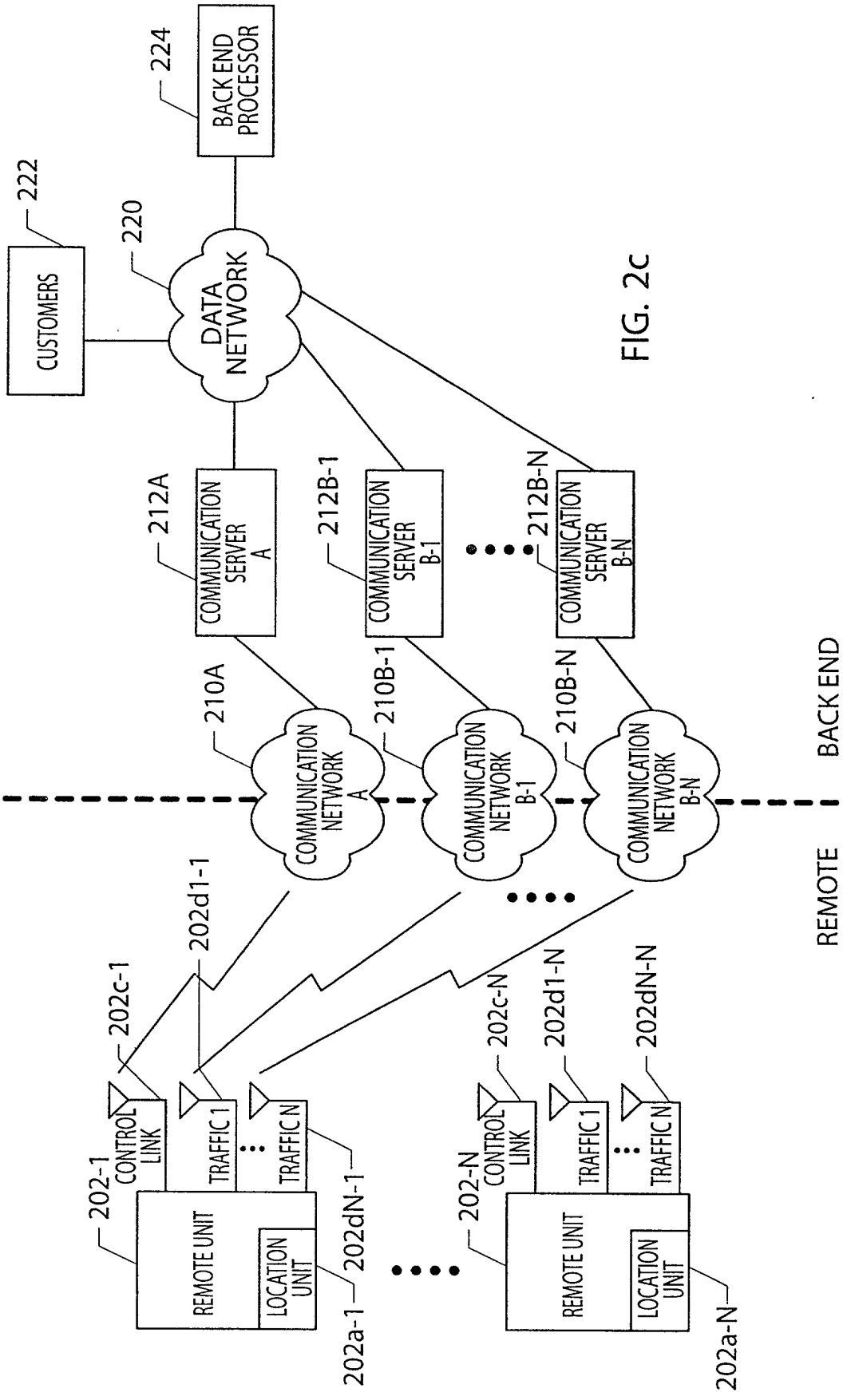
224
BACK END PROCESSOR
222
CUSTOMERS
220
DATA NETWORK
212A
COMMUNICATION SERVER A
212B-1
COMMUNICATION SERVER B-1
212B-N
COMMUNICATION SERVER B-N
210A
COMMUNICATION NETWORK A
210B-1
COMMUNICATION NETWORK B-1
210B-N
COMMUNICATION NETWORK B-N
BACK END
REMOTE
202-1
REMOTE UNIT
CONTROL LINK
TRAFFIC 1
TRAFFIC N
LOCATION UNIT
202c-1
202d1-1
202dN-1
202a-1
202-N
REMOTE UNIT
CONTROL LINK
TRAFFIC 1
TRAFFIC N
LOCATION UNIT
202c-N
202d1-N
202dN-N
202a-N

FIG. 2c

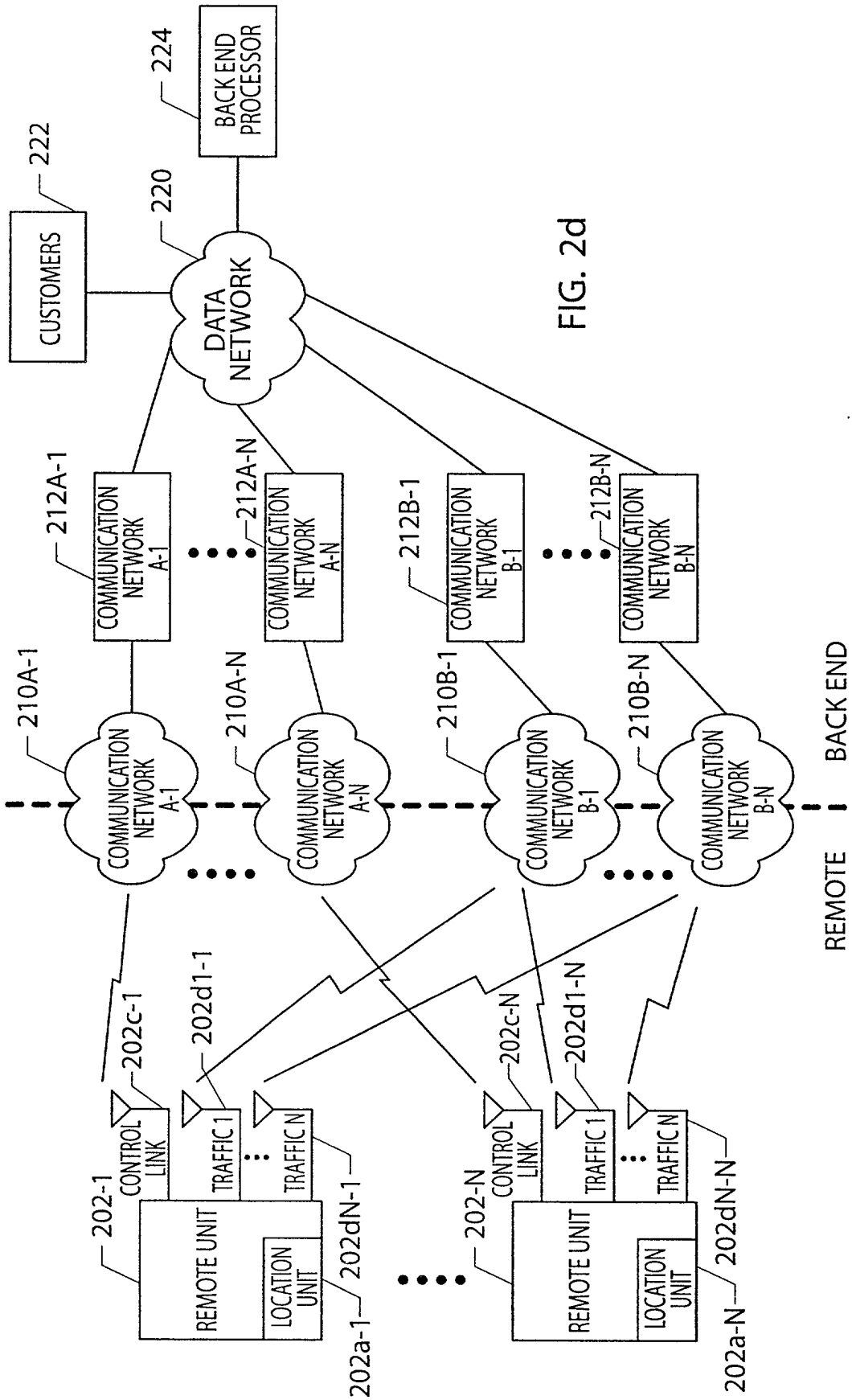
CUSTOMERS
222
DATA NETWORK
220
BACK END PROCESSOR
224
212A-1
212A-N
212B-1
212B-N
COMMUNICATION NETWORK A-1
COMMUNICATION NETWORK A-N
COMMUNICATION NETWORK B-1
COMMUNICATION NETWORK B-N
210A-1
210A-N
210B-1
210B-N
REMOTE
BACK END
202-1
202-N
REMOTE UNIT
LOCATION UNIT
CONTROL LINK
TRAFFIC 1
TRAFFIC N
202c-1
202d1-1
202dN-1
202a-1
202c-N
202d1-N
202dN-N
202a-N

FIG. 2d

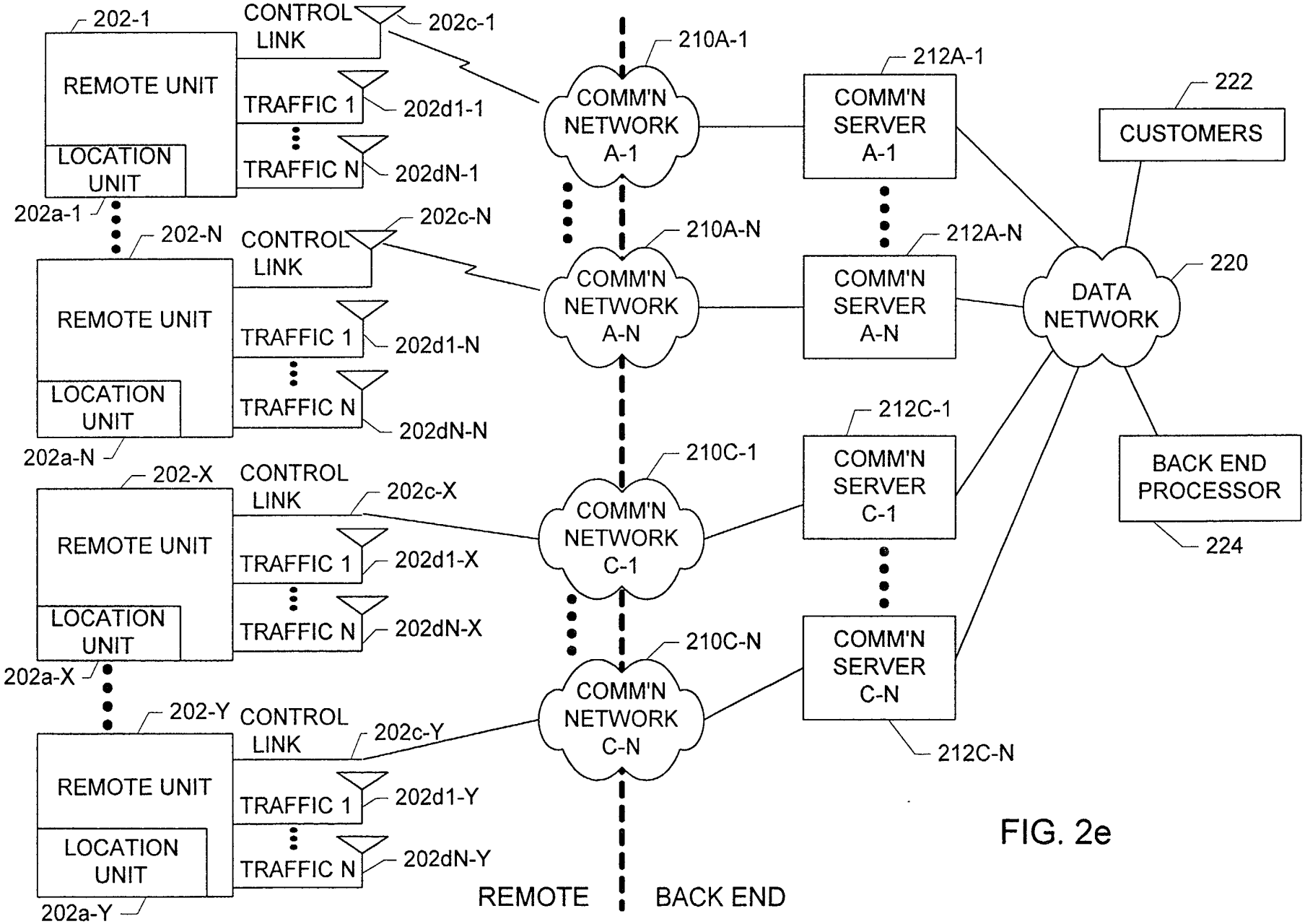
202-1
CONTROL LINK
202c-1
REMOTE UNIT
TRAFFIC 1
202d1-1
LOCATION UNIT
TRAFFIC N
202dN-1
202a-1
202-N
CONTROL LINK
202c-N
REMOTE UNIT
TRAFFIC 1
202d1-N
LOCATION UNIT
TRAFFIC N
202dN-N
202a-N
202-X
CONTROL LINK
202c-X
REMOTE UNIT
TRAFFIC 1
202d1-X
LOCATION UNIT
TRAFFIC N
202dN-X
202a-X
202-Y
CONTROL LINK
202c-Y
REMOTE UNIT
TRAFFIC 1
202d1-Y
LOCATION UNIT
TRAFFIC N
202dN-Y
202a-Y
210A-1
COMM'N NETWORK A-1
210A-N
COMM'N NETWORK A-N
210C-1
COMM'N NETWORK C-1
210C-N
COMM'N NETWORK C-N
212A-1
COMM'N SERVER A-1
212A-N
COMM'N SERVER A-N
212C-1
COMM'N SERVER C-1
212C-N
COMM'N SERVER C-N
222
CUSTOMERS
220
DATA NETWORK
BACK END PROCESSOR
224
REMOTE
BACK END

FIG. 2e

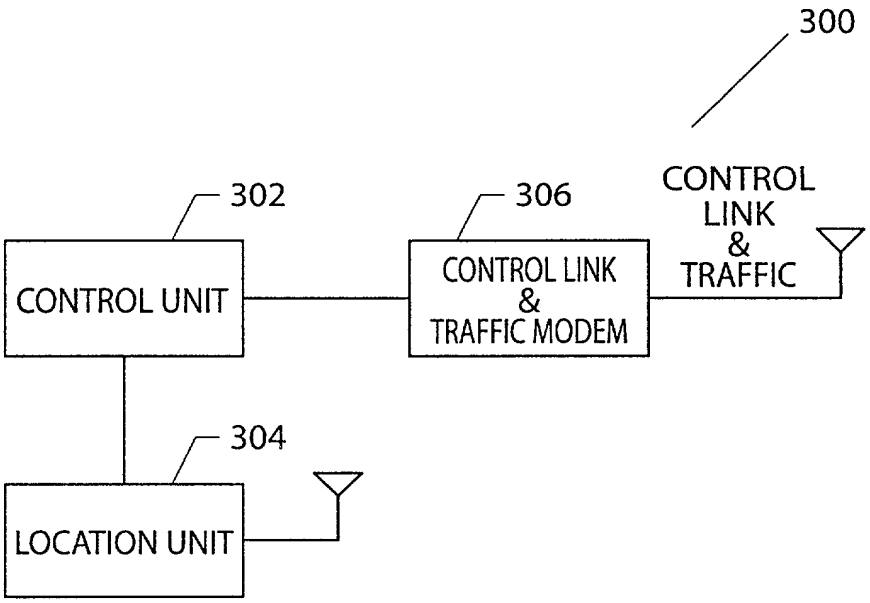

FIG. 3a

Petitioner's Exhibit 1004
IPR2017-00569

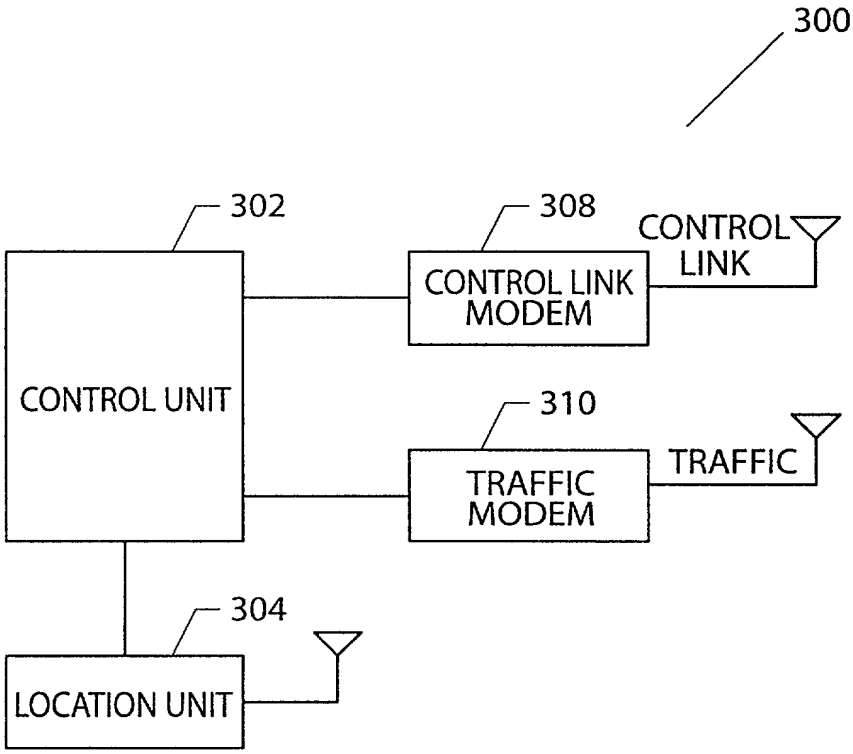

FIG. 3b

WO 2007/095556 PCT/US2007/062046

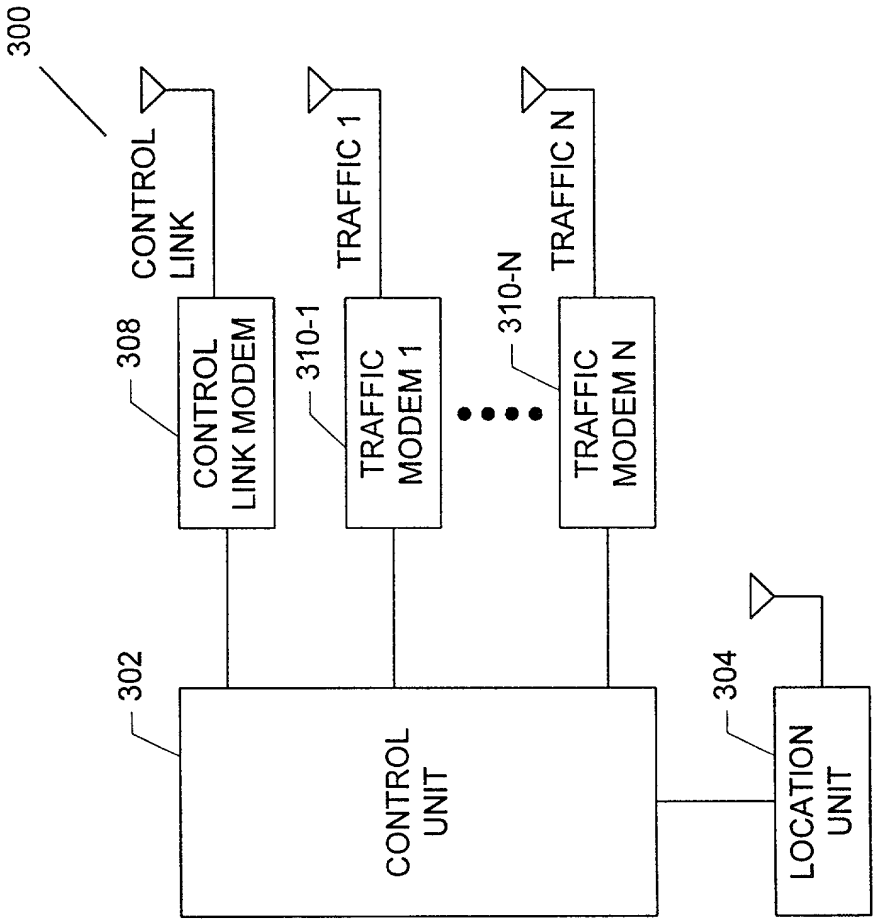
300
CONTROL LINK
TRAFFIC 1
TRAFFIC N
308
310-1
310-N
CONTROL LINK MODEM
TRAFFIC MODEM 1
TRAFFIC MODEM N
302
304
CONTROL UNIT
LOCATION UNIT

FIG. 3c

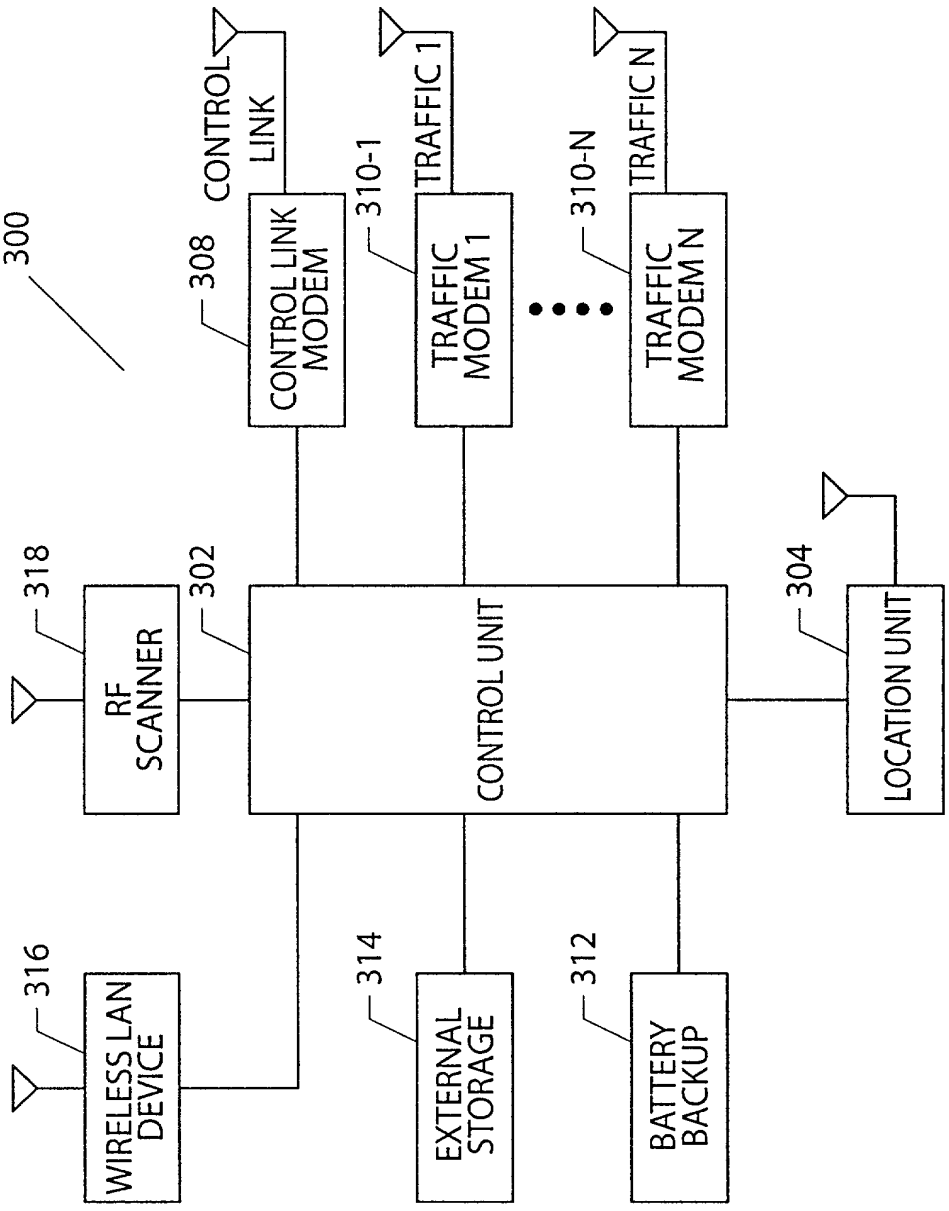
300
CONTROL LINK
308
CONTROL LINK MODEM
310-1
TRAFFIC 1
TRAFFIC MODEM 1
310-N
TRAFFIC N
TRAFFIC MODEM N
318
RF SCANNER
302
CONTROL UNIT
304
LOCATION UNIT
316
WIRELESS LAN DEVICE
314
EXTERNAL STORAGE
312
BATTERY BACKUP

FIG. 3d

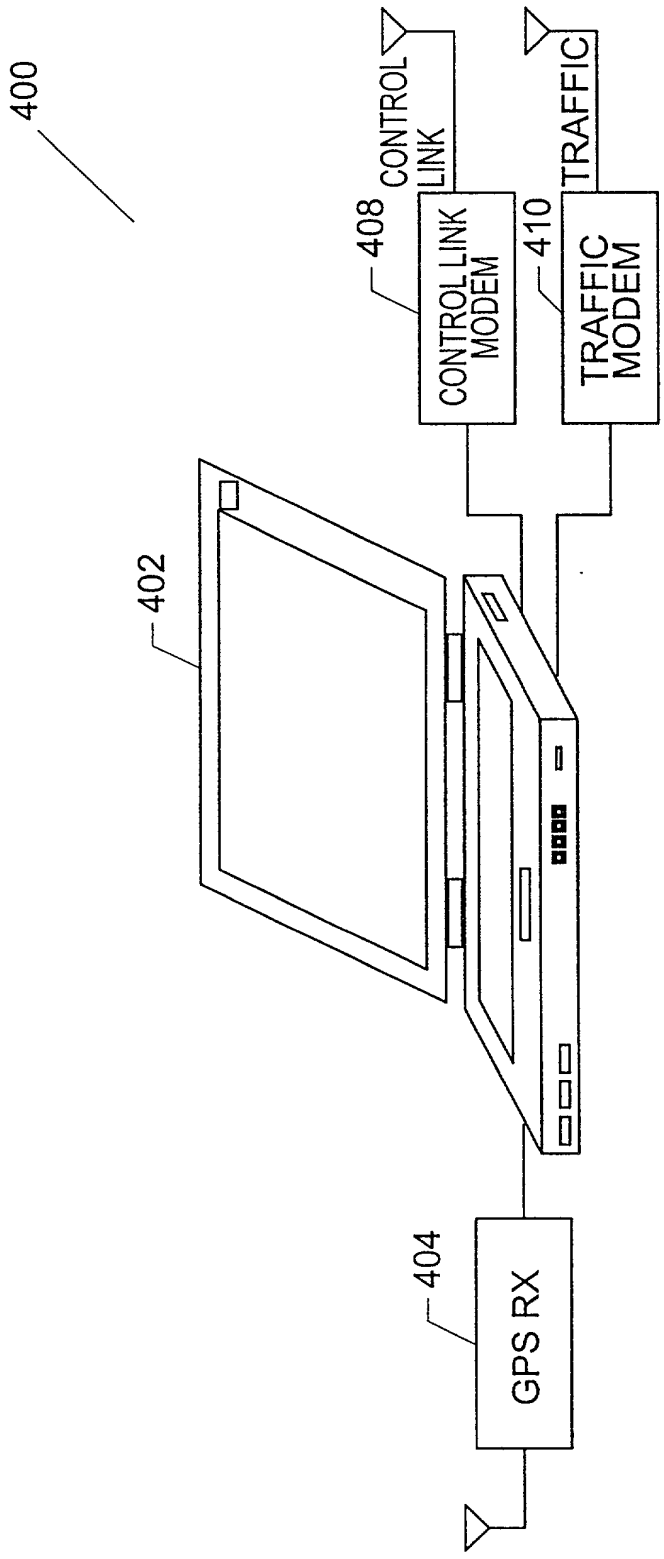
400
402
404
GPS RX
408
CONTROL LINK MODEM
410
TRAFFIC MODEM
CONTROL LINK
TRAFFIC

FIG. 4a

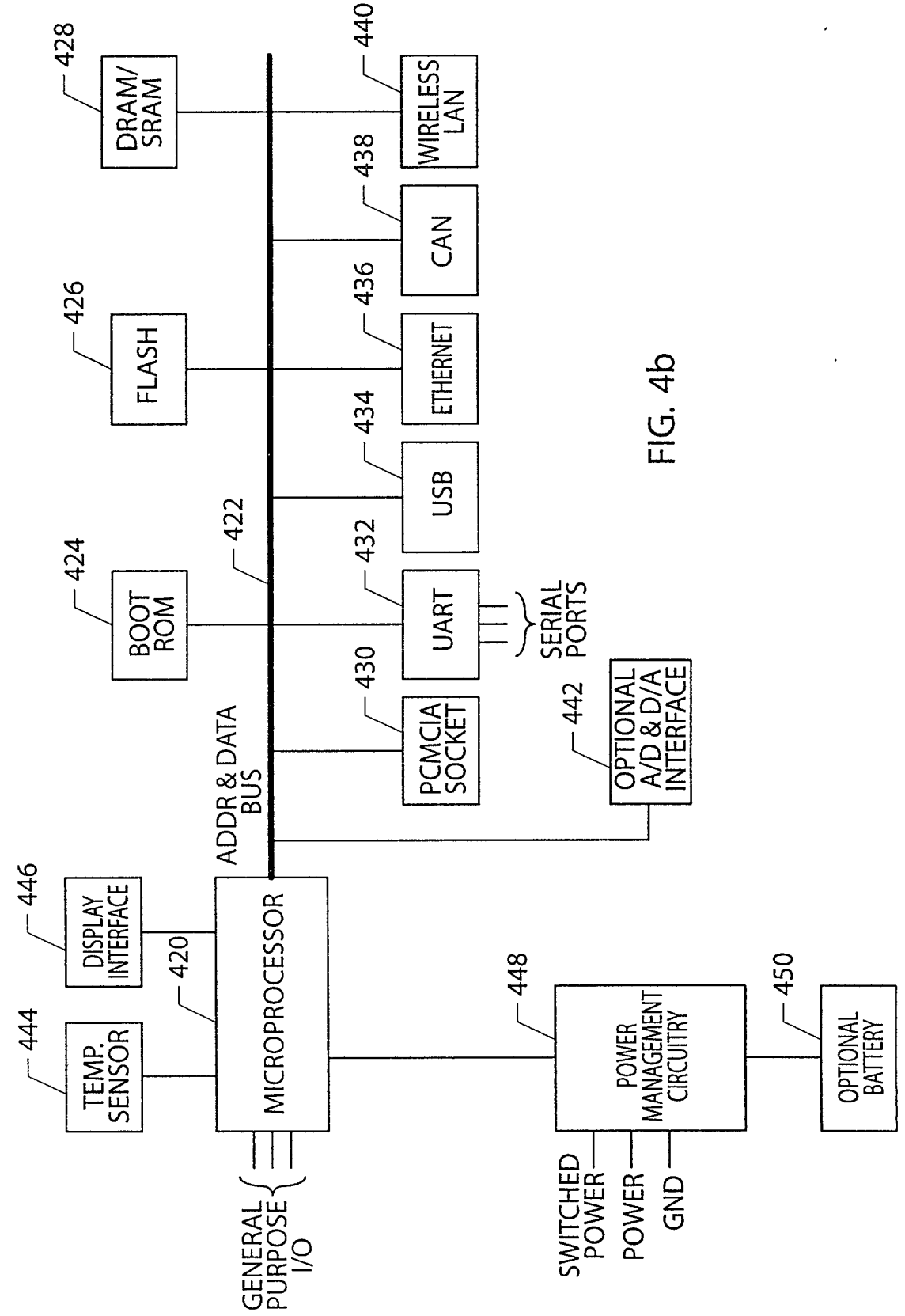
DRAM/ SRAM
428
WIRELESS LAN
440
FLASH
426
CAN
438
ETHERNET
436
BOOT ROM
424
USB
434
UART
432
SERIAL PORTS
ADDR & DATA BUS
422
PCMCIA SOCKET
430
OPTIONAL A/D & D/A INTERFACE
442
DISPLAY INTERFACE
446
TEMP. SENSOR
444
MICROPROCESSOR
420
POWER MANAGEMENT CIRCUITRY
448
OPTIONAL BATTERY
450
GENERAL PURPOSE I/O
SWITCHED POWER
POWER
GND

FIG. 4b

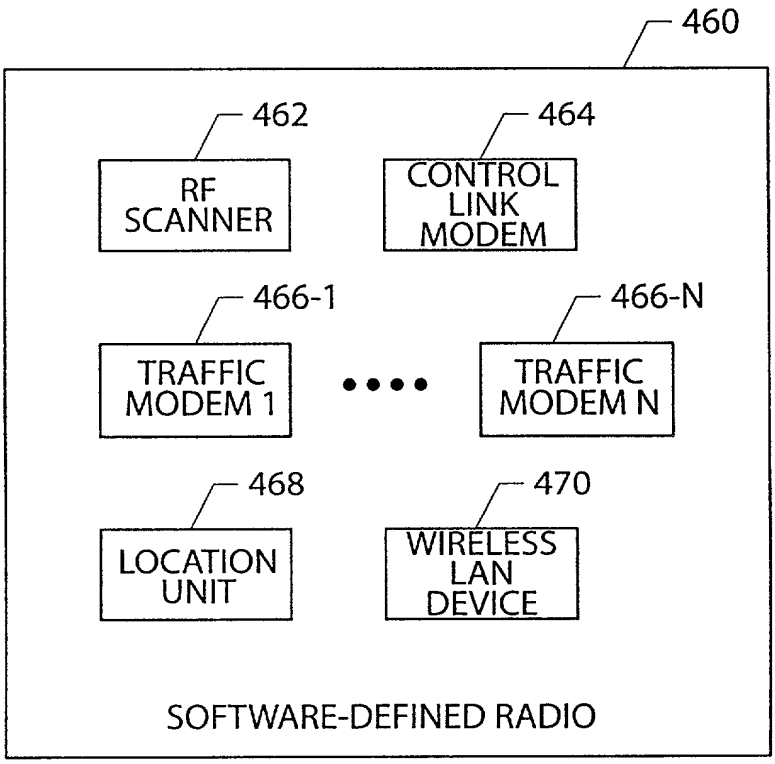

FIG. 4c

Docket No. 050078

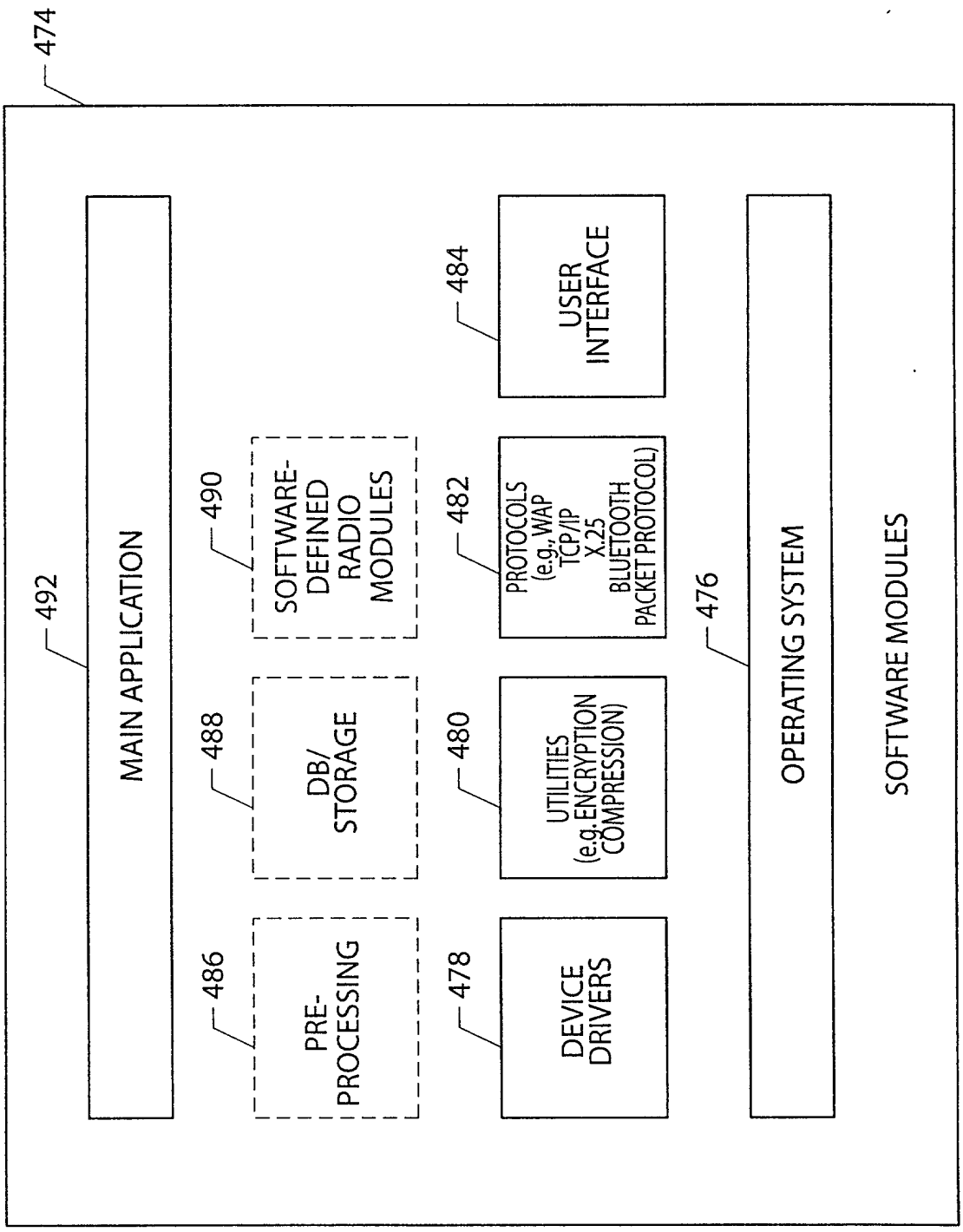
474
SOFTWARE MODULES
OPERATING SYSTEM
476
MAIN APPLICATION
492
PRE-PROCESSING
486
DB/ STORAGE
488
SOFTWARE-DEFINED RADIO MODULES
490
DEVICE DRIVERS
478
UTILITIES (e.g.,ENCRYPTION COMPRESSION)
480
PROTOCOLS (e.g.,WAP TCP/IP X.25 BLUETOOTH PACKET PROTOCOL)
482
USER INTERFACE
484

FIG. 4d

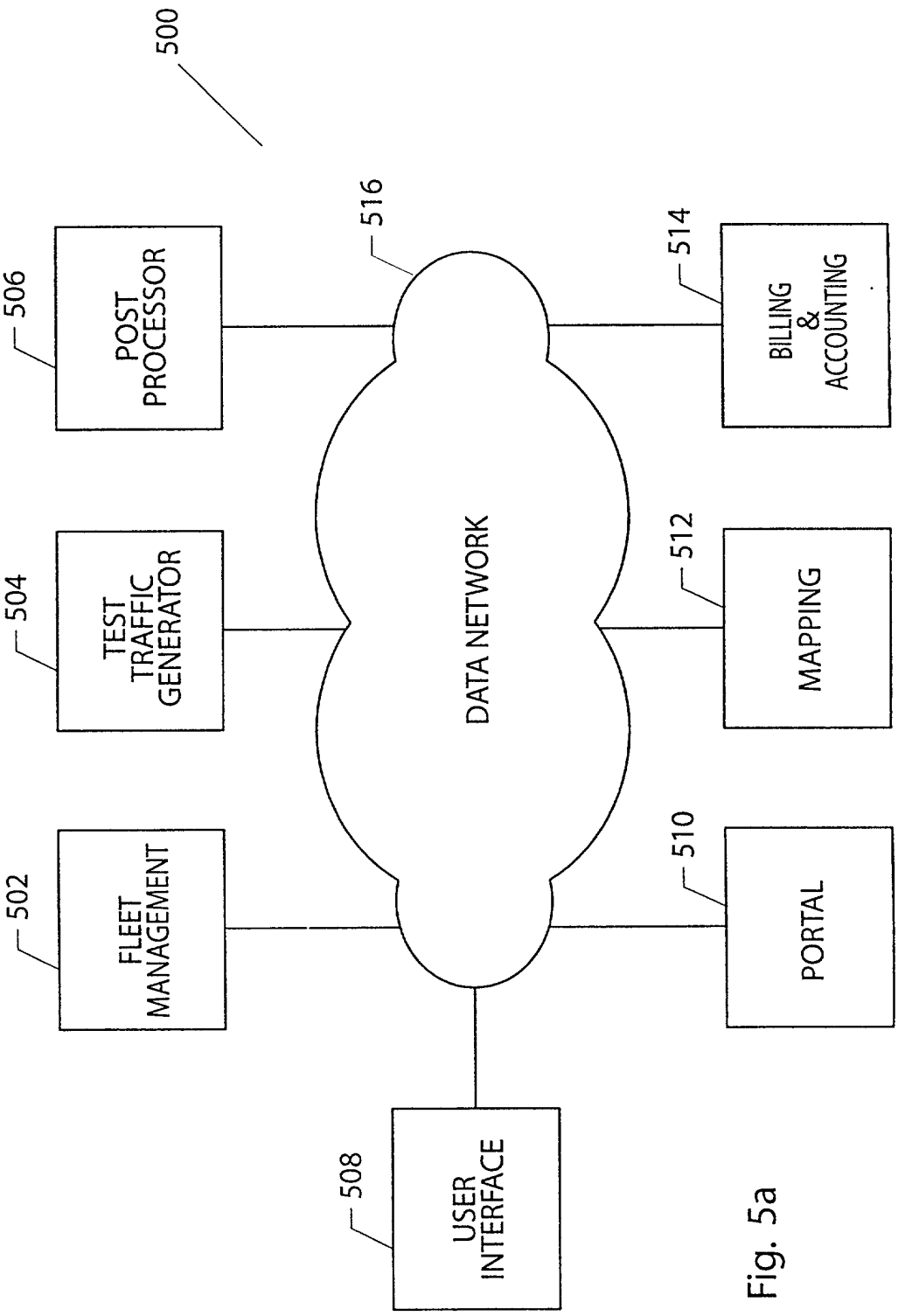
500
502
FLEET MANAGEMENT
504
TEST TRAFFIC GENERATOR
506
POST PROCESSOR
508
USER INTERFACE
510
PORTAL
512
MAPPING
514
BILLING & ACCOUNTING
516
DATA NETWORK

Fig. 5a

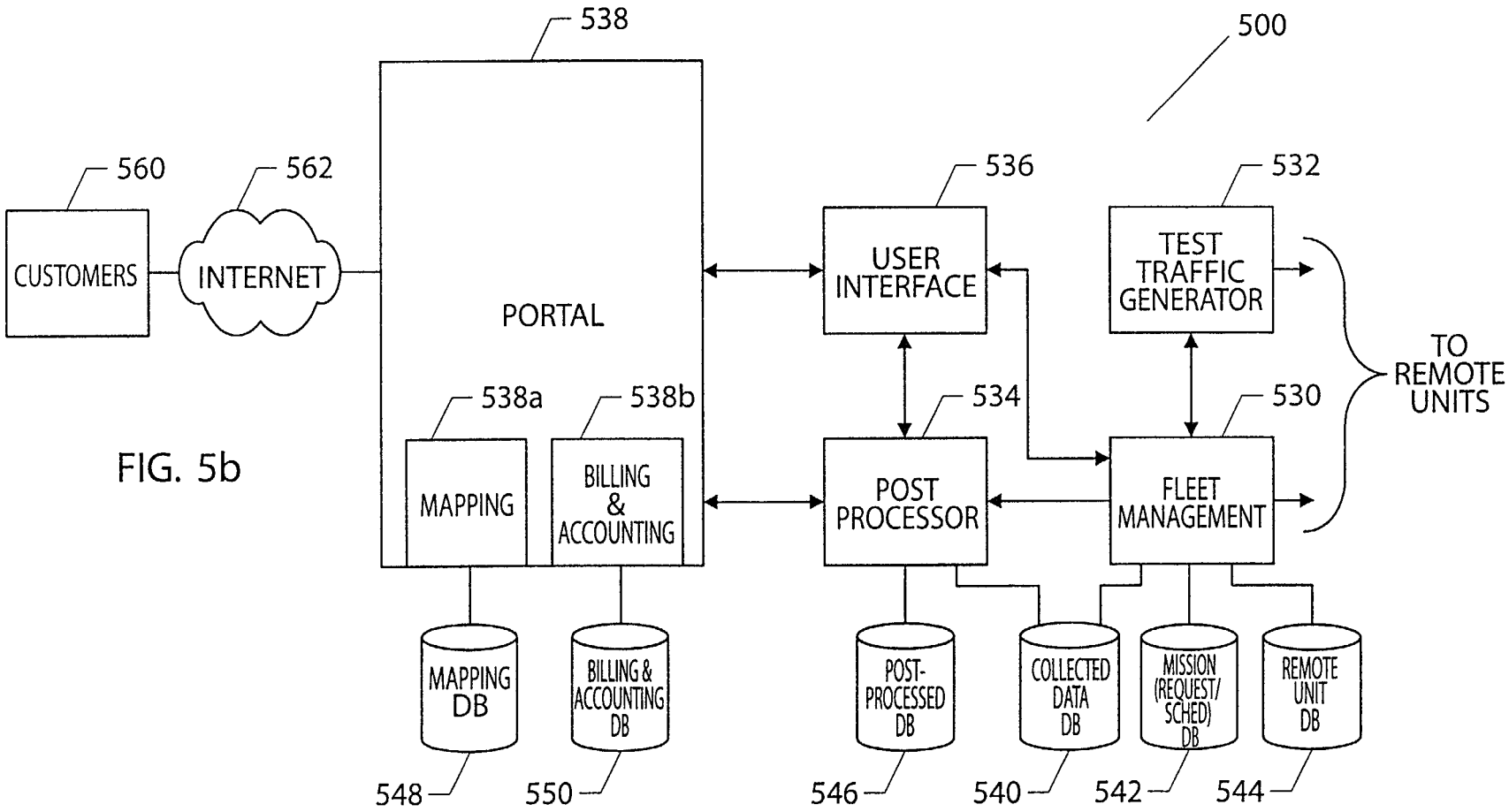
538
500
560
562
536
532
CUSTOMERS
INTERNET
PORTAL
USER INTERFACE
TEST TRAFFIC GENERATOR
TO REMOTE UNITS
538a
538b
534
530
MAPPING
BILLING & ACCOUNTING
POST PROCESSOR
FLEET MANAGEMENT
MAPPING DB
BILLING & ACCOUNTING DB
POST-PROCESSED DB
COLLECTED DATA DB
MISSION (REQUEST/ SCHED) DB
REMOTE UNIT DB
548
550
546
540
542
544

FIG. 5b

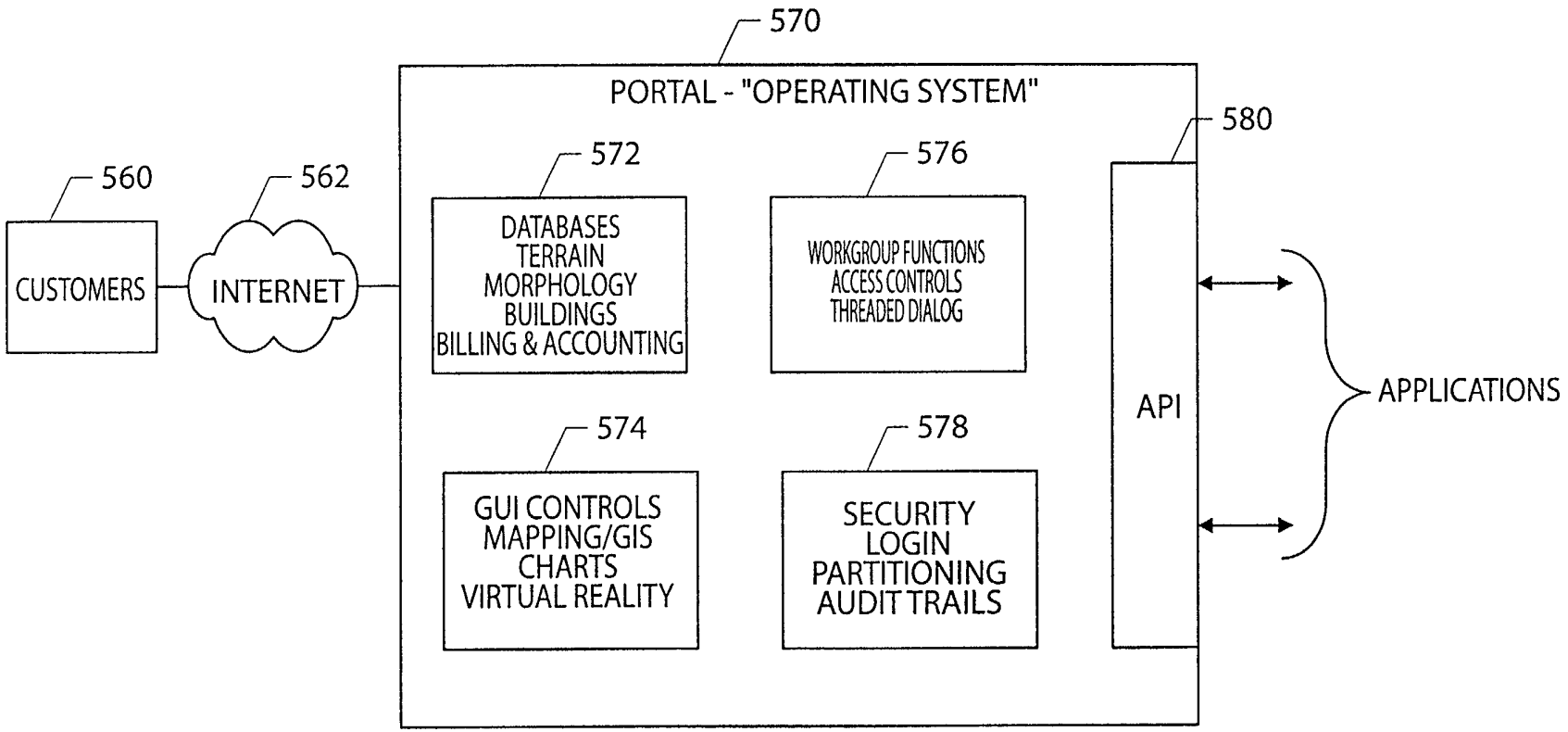
570
PORTAL - "OPERATING SYSTEM"
580
560
562
572
576
CUSTOMERS
INTERNET
DATABASES
TERRAIN
MORPHOLOGY
BUILDINGS
BILLING & ACCOUNTING
WORKGROUP FUNCTIONS
ACCESS CONTROLS
THREADED DIALOG
API
APPLICATIONS
574
578
GUI CONTROLS
MAPPING/GIS
CHARTS
VIRTUAL REALITY
SECURITY
LOGIN
PARTITIONING
AUDIT TRAILS

FIG. 5c

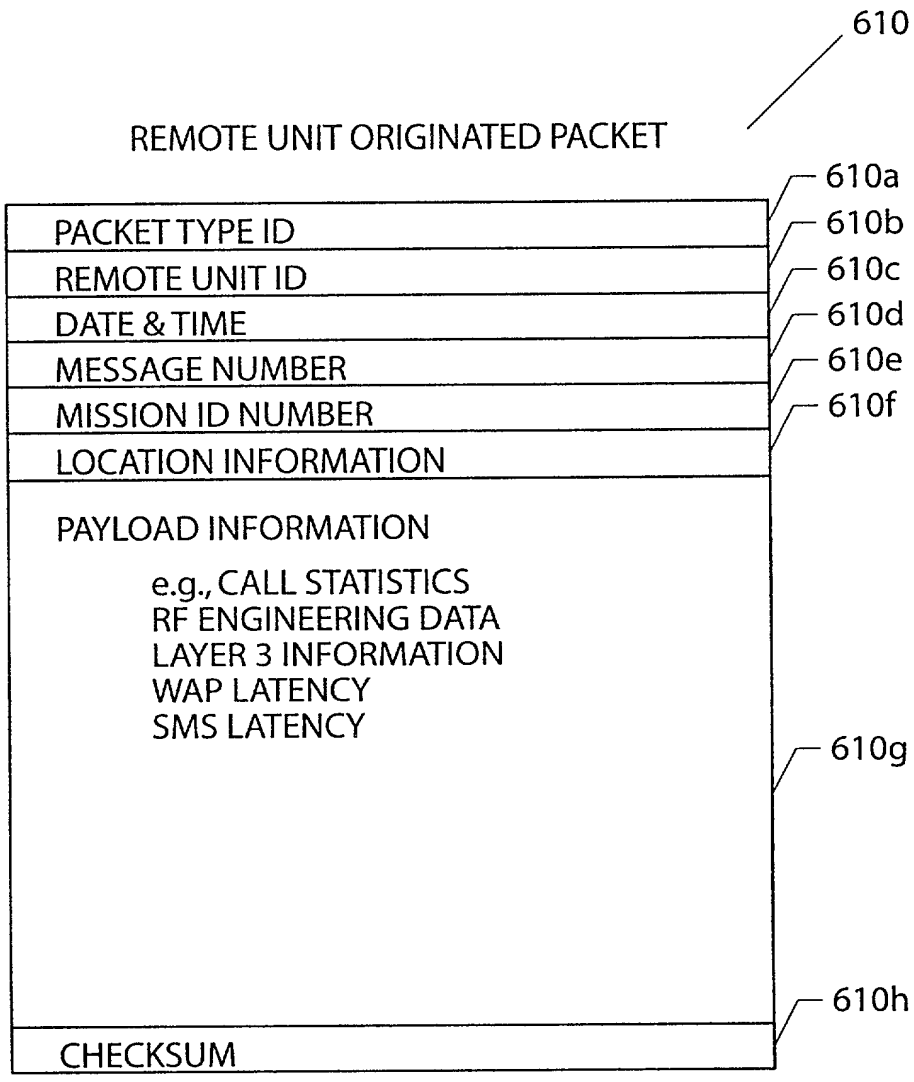

FIG. 6a

Docket No. 95955-0700

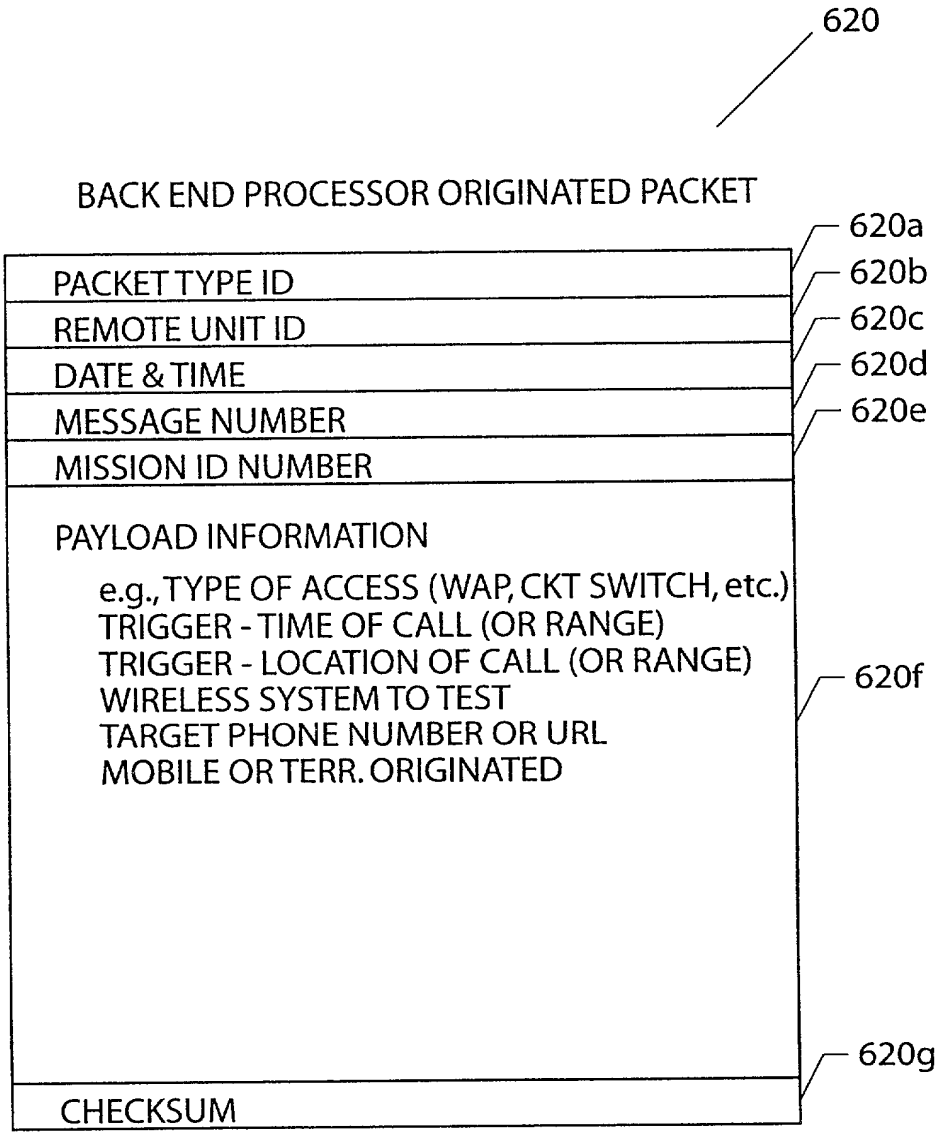

FIG. 6b

Docket No. 9660.0700

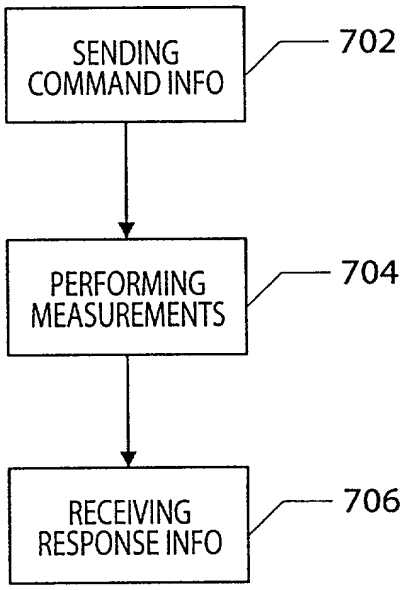

FIG. 7a

WO 2006/135601 PCT/US2006/021630

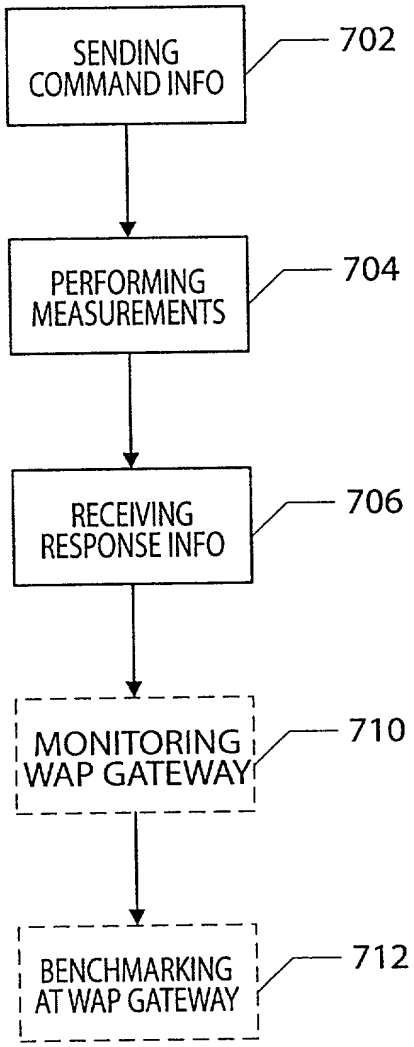

FIG. 7b

EP 1 569 501 A1

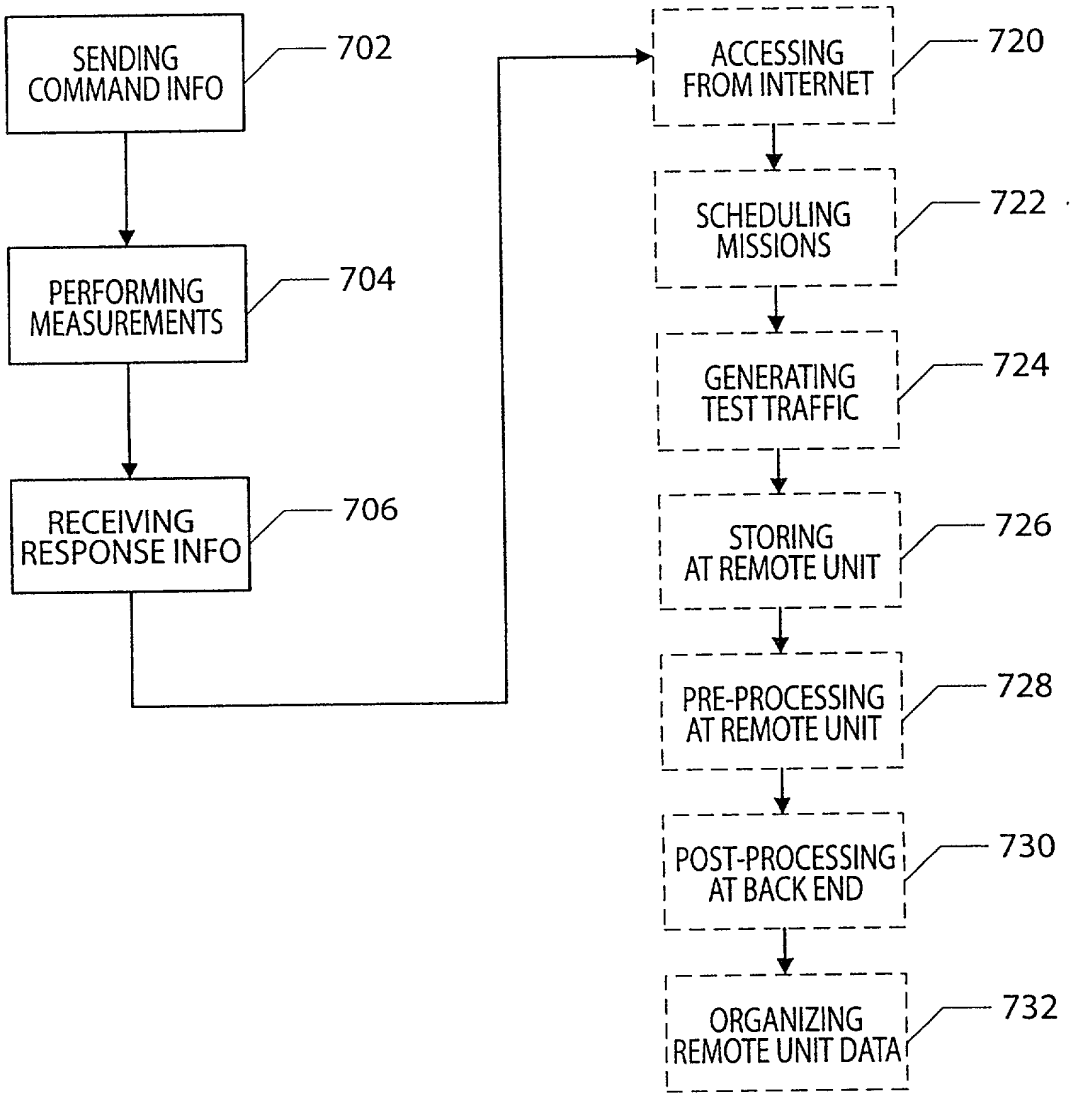
SENDING COMMAND INFO
702
PERFORMING MEASUREMENTS
704
RECEIVING RESPONSE INFO
706
ACCESSING FROM INTERNET
720
SCHEDULING MISSIONS
722
GENERATING TEST TRAFFIC
724
STORING AT REMOTE UNIT
726
PRE-PROCESSING AT REMOTE UNIT
728
POST-PROCESSING AT BACK END
730
ORGANIZING REMOTE UNIT DATA
732

FIG. 7c

SERVICE: COMPARE PORTALS
REPORT: DOWNLOAD TIME
BY: CITY
BY: ALL CARRIERS
FREQUENCY: 15 MINUTES
TIME: 6 AM - 12 PM
PERIOD: 03/01/00 - 03/07/00
BENCHMARK: PORTAL INDEX
AOL.COM

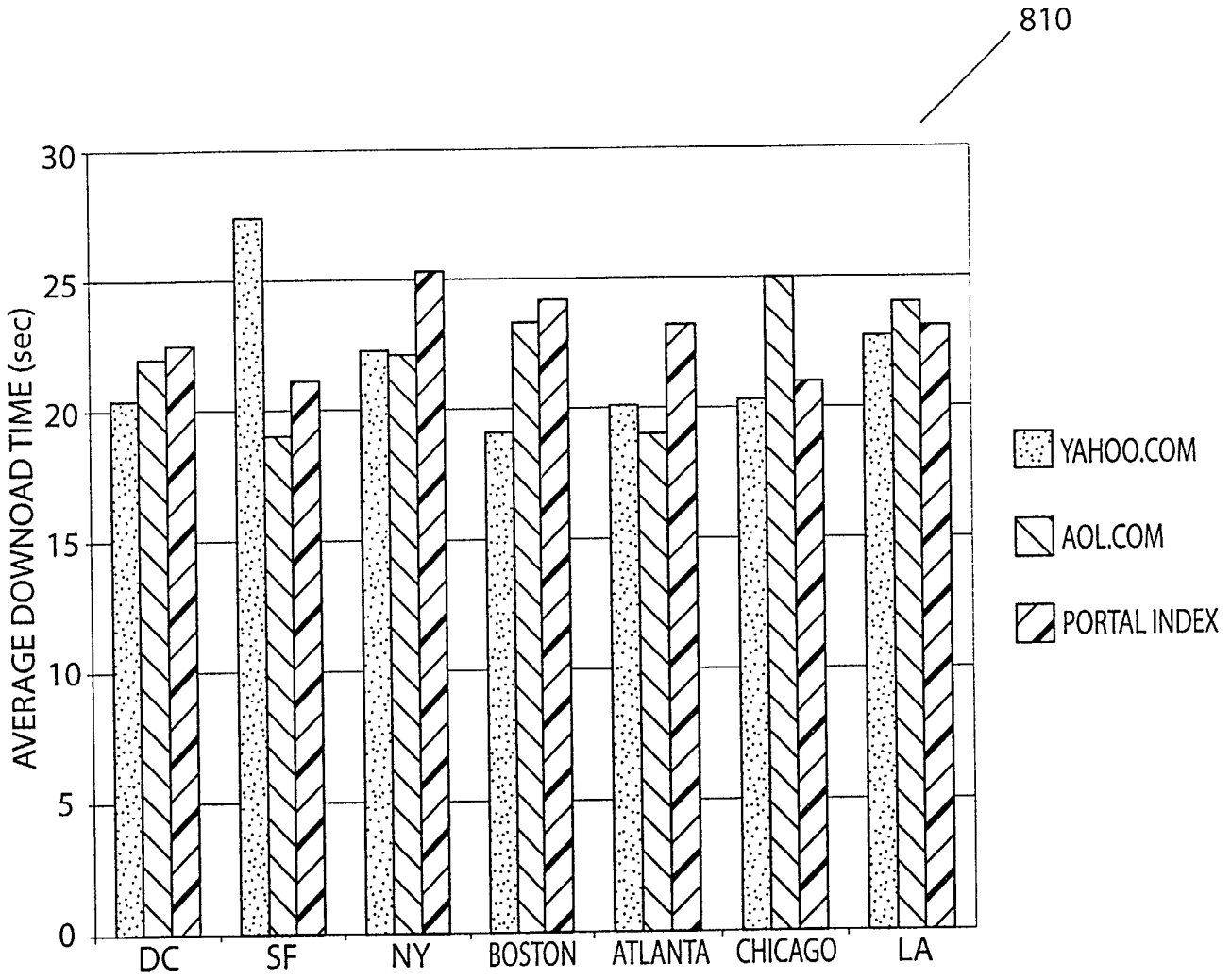

FIG. 8a

URL: YAHOO.COM
SERVICE: COMPARE WIRELESS OPERATORS
REPORT: DOWNLOAD TIME
BY: CITY
BY: CARRIER
FREQUENCY: 30 MINUTES
TIME: 6 AM - 9 PM
PERIOD: 03/01/00 - 03/07/00

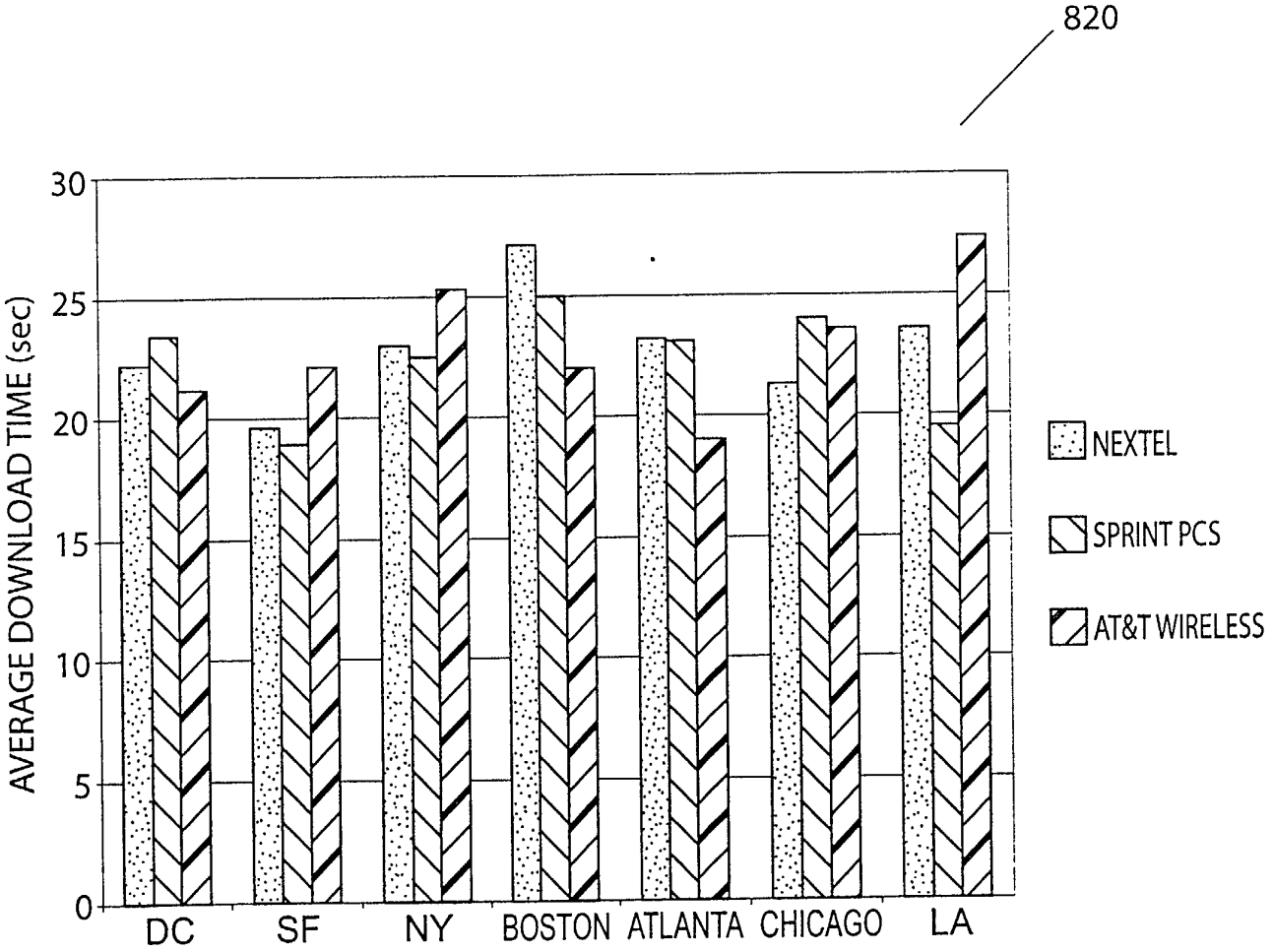

FIG. 8b

URL: YAHOO.COM
SERVICE: COMPARE WIRELESS OPERATORS
REPORT: COMPLETION PERCENT
BY: CITY
BY: CARRIER
FREQUENCY: 30 MINUTES
TIME: 6 AM - 9 PM
PERIOD: 03/01/00 - 03/07/00

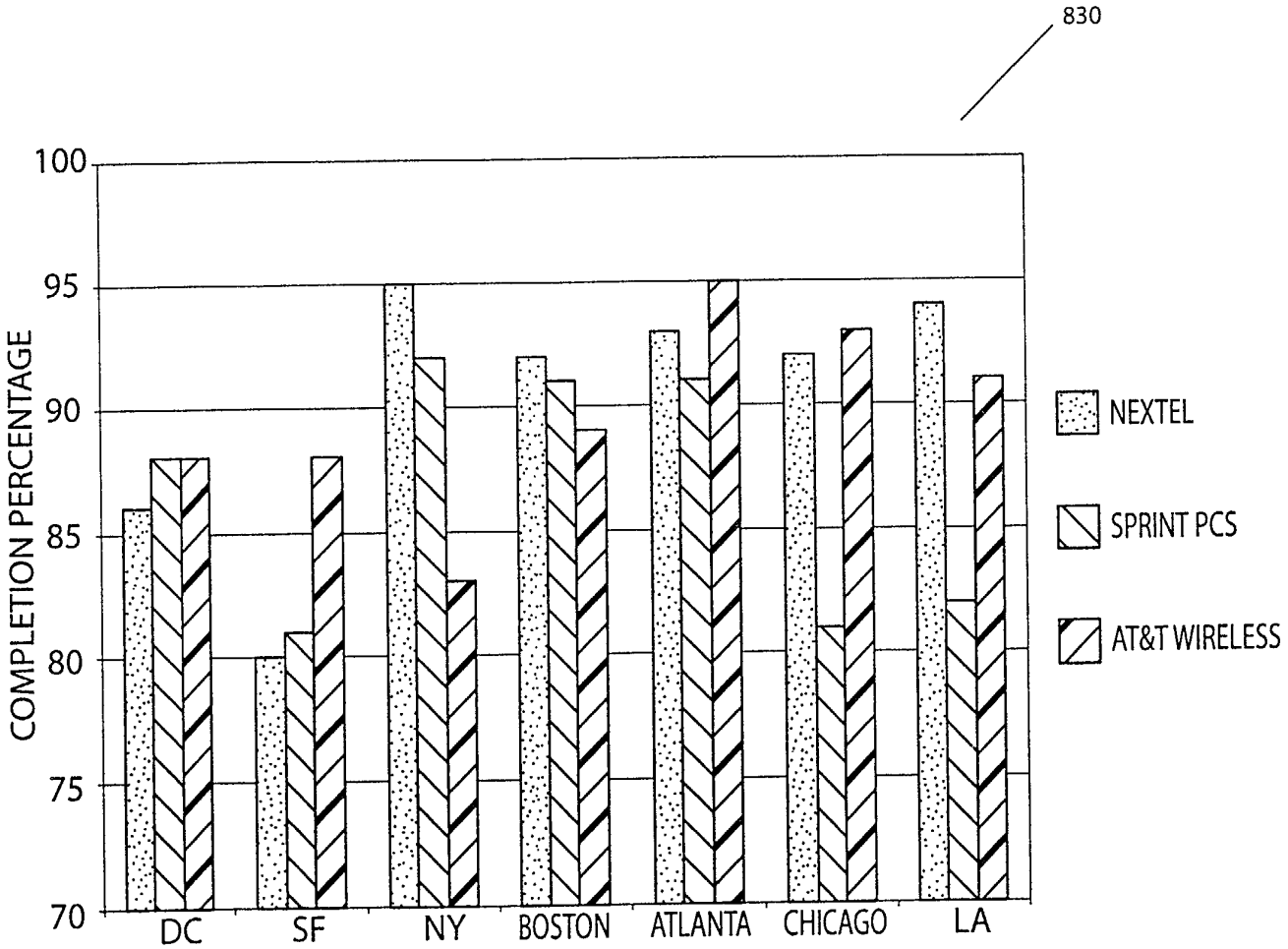

FIG. 8c

840

URL: YAHOO.COM
SERVICE: TREND WIRELESS OPERATORS
REPORT: COMPLETION PERCENT
BY: CITY
BY: CARRIER
FREQUENCY: 15 MINUTES
TIME: 6 AM - 9 PM
PERIOD: 03/01/00 - 03/07/00

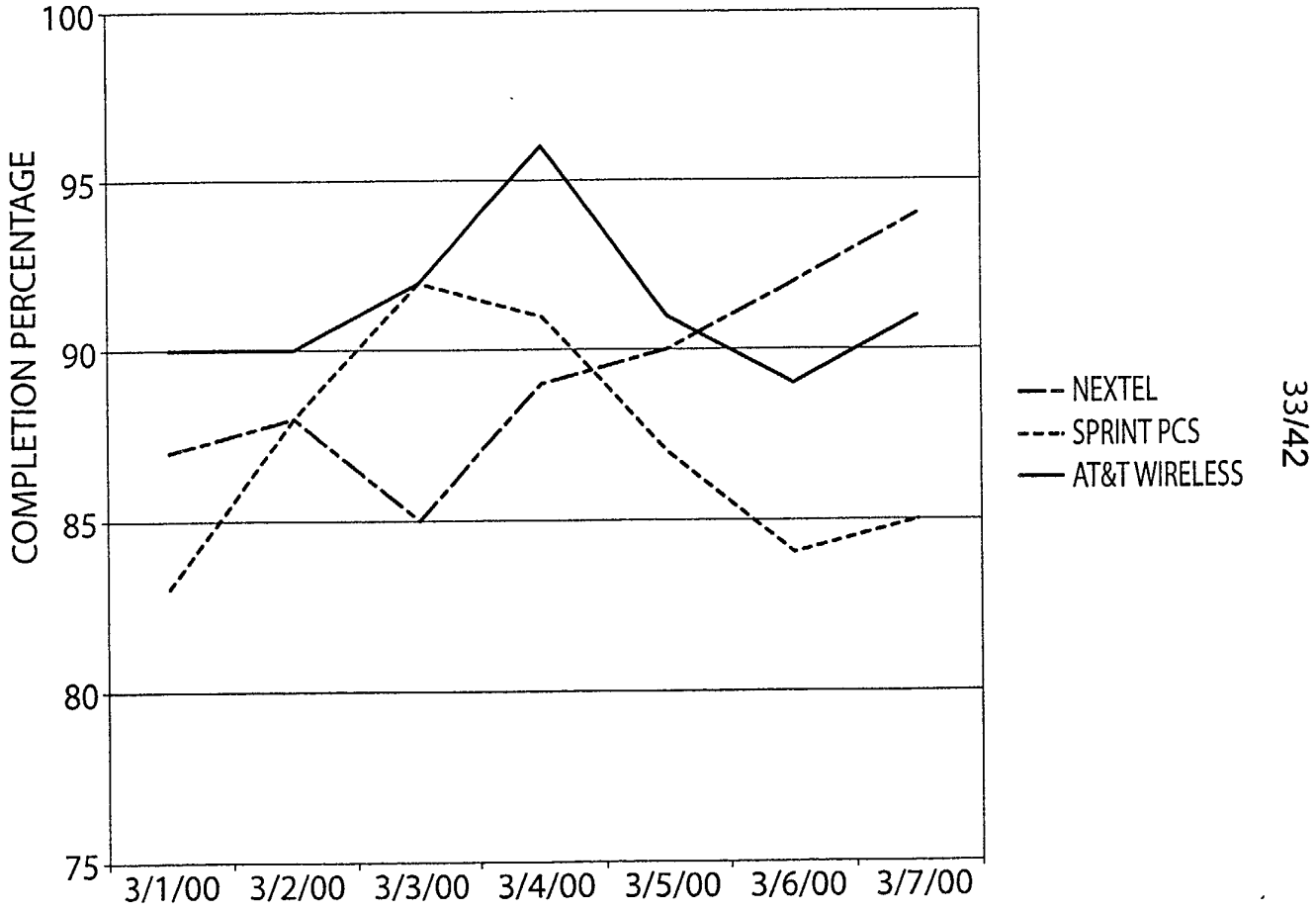

FIG. 8d

URL: YAHOO.COM
SERVICE: GATEWAY BREAKDOWN
REPORT: DOWNLOAD TIME COMPONENTS 1
BY: CITY
CARRIER: NEXTEL
FREQUENCY: 60 MINUTES
TIME: 12 PM - 12 PM
PERIOD: 03/01/00 - 03/07/00

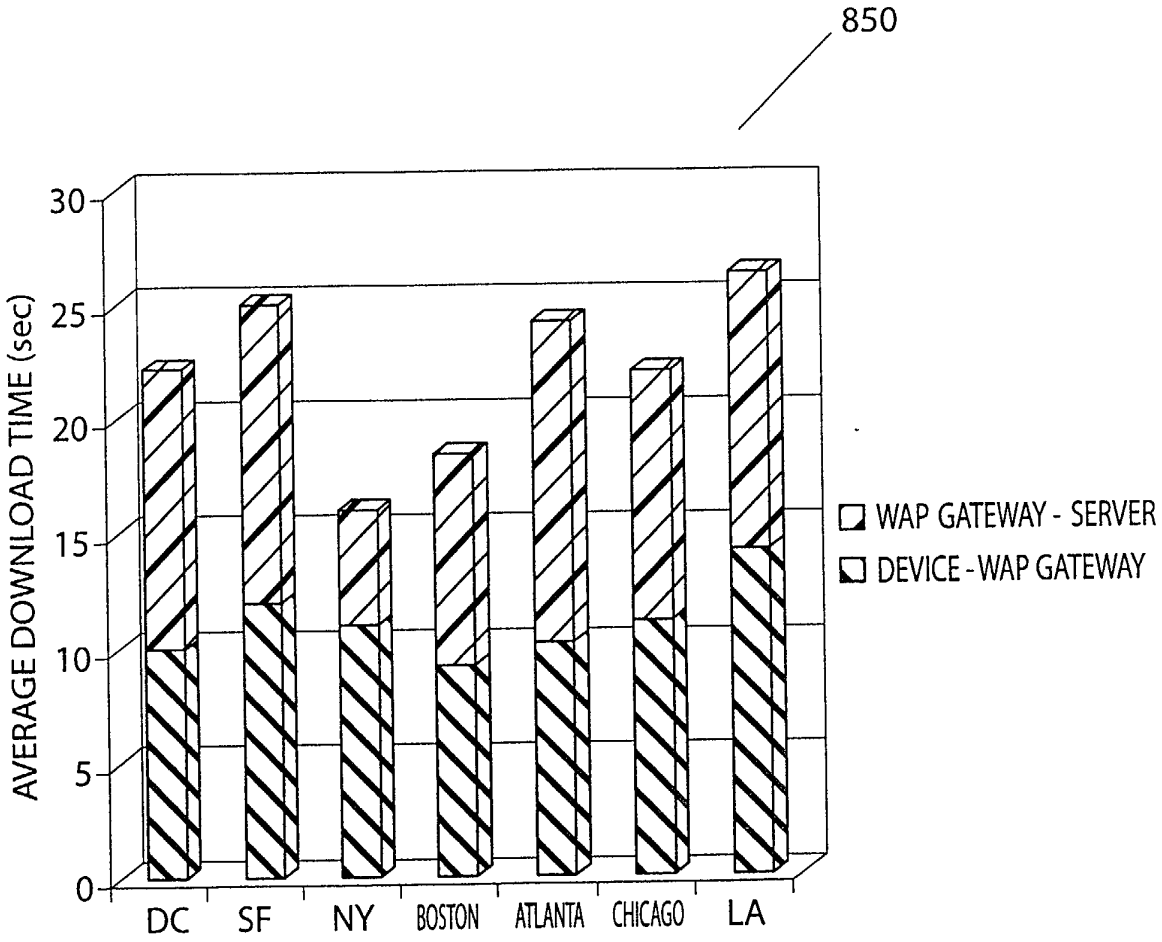

FIG. 8e

URL: YAHOO.COM
SERVICE: ERROR STATS
REPORT: ERROR REPORT
BY: ALL CITIES
CARRIER: ALL CARRIERS
FREQUENCY: 60 MINUTES
TIME: 12 PM - 12 PM
PERIOD: 03/01/00 - 03/07/00

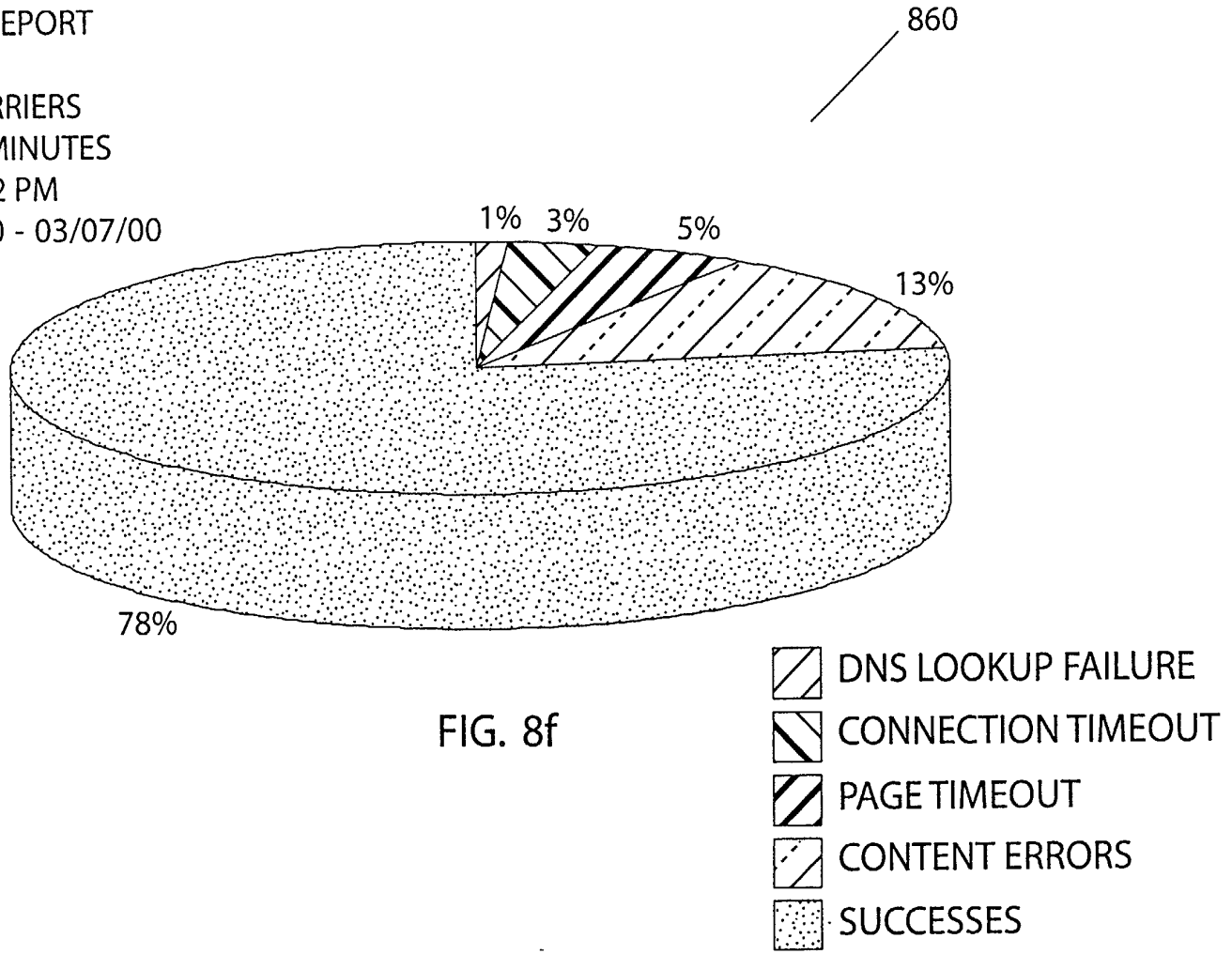

FIG. 8f

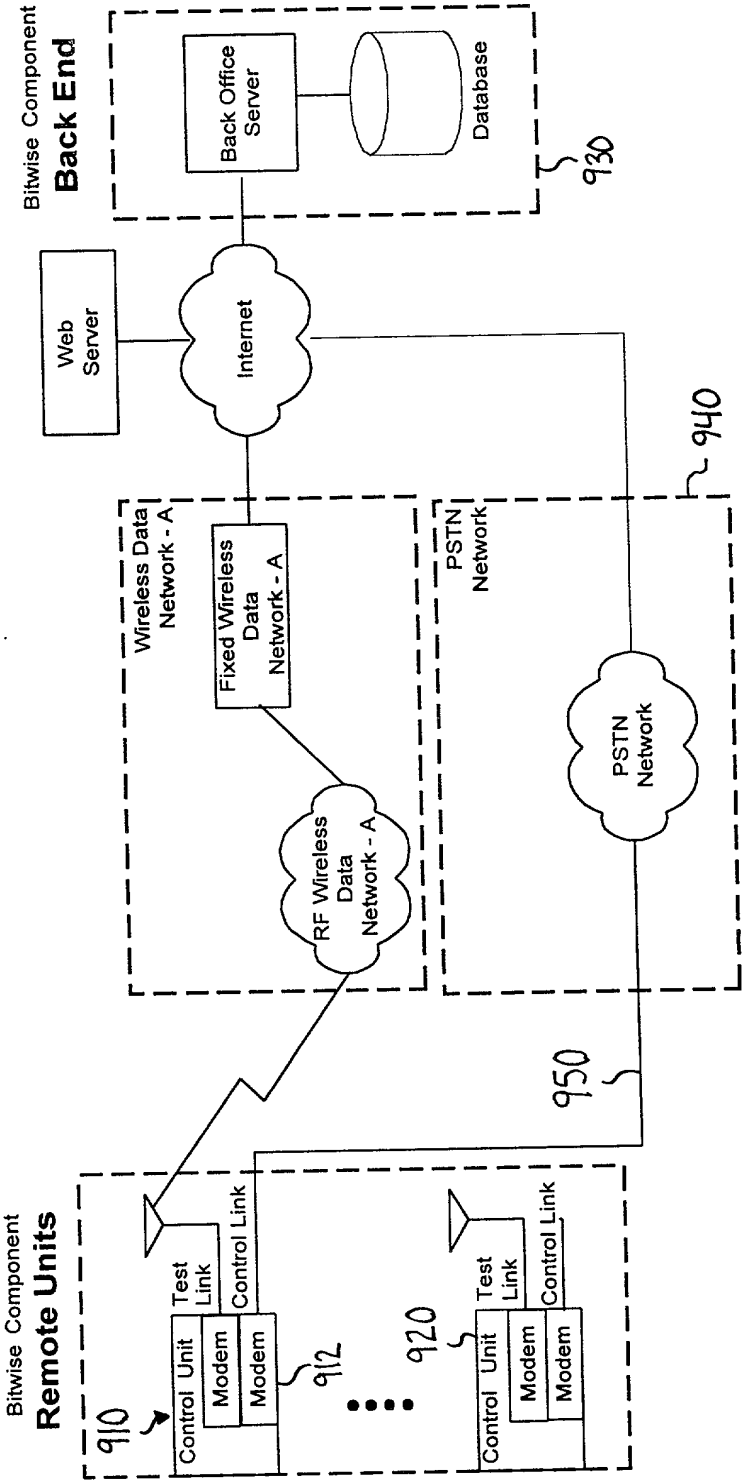
Bitwise Component
Back End
Back Office Server
Database
930
Web Server
Internet
940
Wireless Data Network - A
Fixed Wireless Data Network - A
RF Wireless Data Network - A
PSTN Network
PSTN Network
950
Bitwise Component
Remote Units
910
Control Unit
Test Link
Control Link
Modem
Modem
912
920
Control Unit
Test Link
Control Link
Modem
Modem

FIG. 9

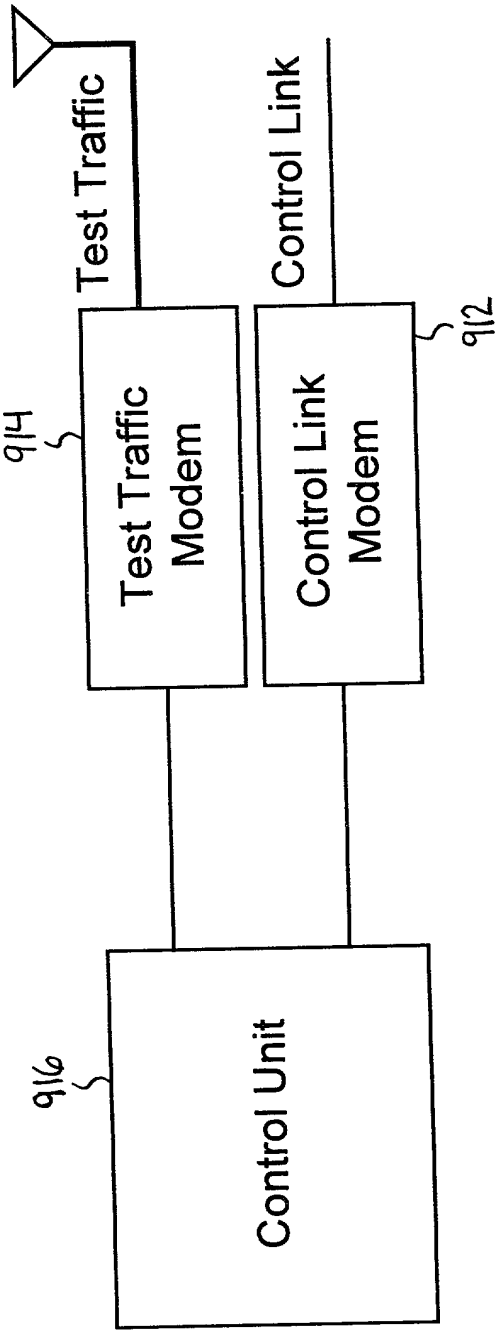
Test Traffic
Control Link
914
Test Traffic Modem
Control Link Modem
912
916
Control Unit

FIG. 10

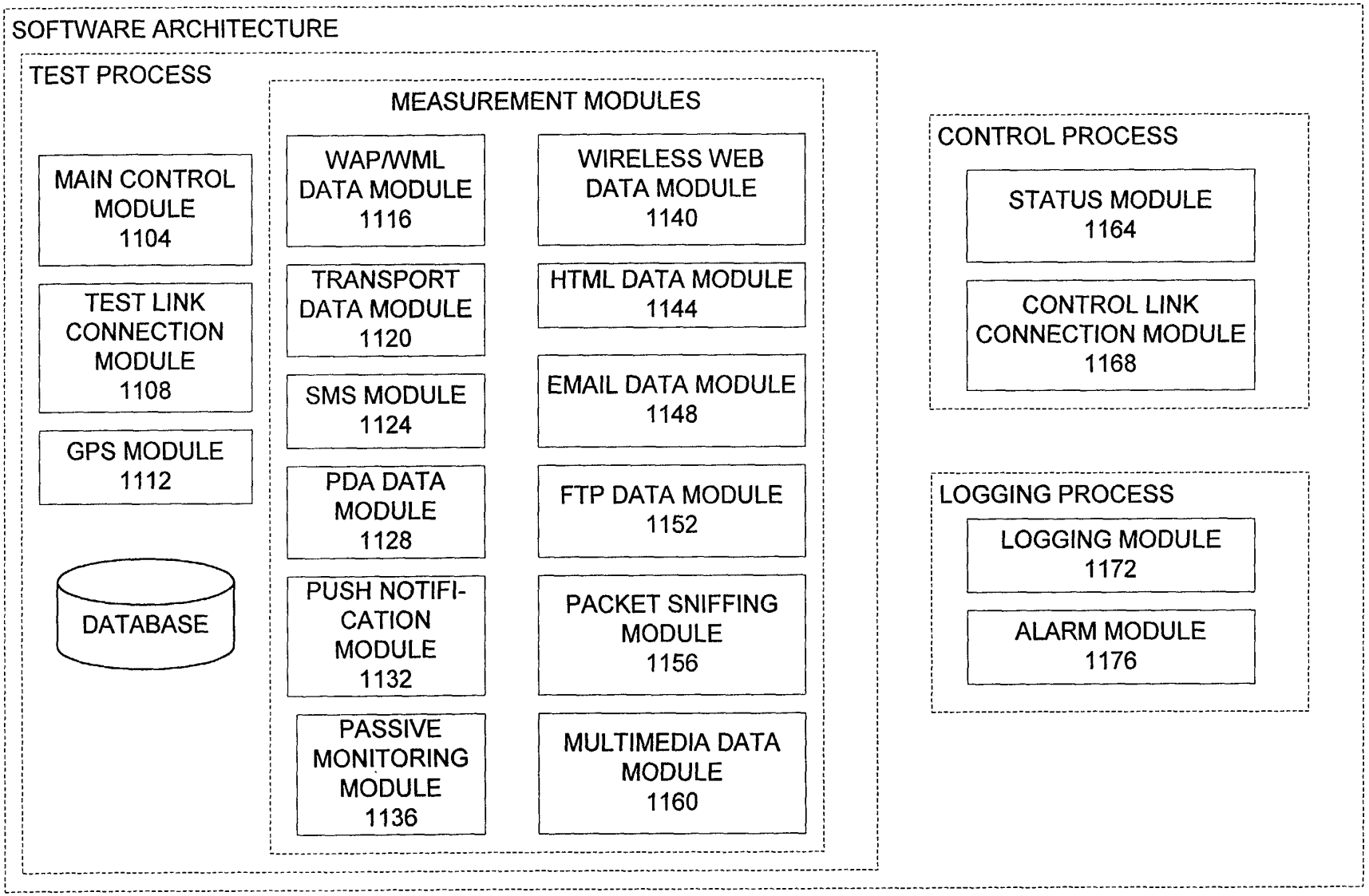
SOFTWARE ARCHITECTURE
TEST PROCESS
MAIN CONTROL MODULE 1104
TEST LINK CONNECTION MODULE 1108
GPS MODULE 1112
DATABASE
MEASUREMENT MODULES
WAP/WML DATA MODULE 1116
TRANSPORT DATA MODULE 1120
SMS MODULE 1124
PDA DATA MODULE 1128
PUSH NOTIFI-CATION MODULE 1132
PASSIVE MONITORING MODULE 1136
WIRELESS WEB DATA MODULE 1140
HTML DATA MODULE 1144
EMAIL DATA MODULE 1148
FTP DATA MODULE 1152
PACKET SNIFFING MODULE 1156
MULTIMEDIA DATA MODULE 1160
CONTROL PROCESS
STATUS MODULE 1164
CONTROL LINK CONNECTION MODULE 1168
LOGGING PROCESS
LOGGING MODULE 1172
ALARM MODULE 1176

FIG. 11

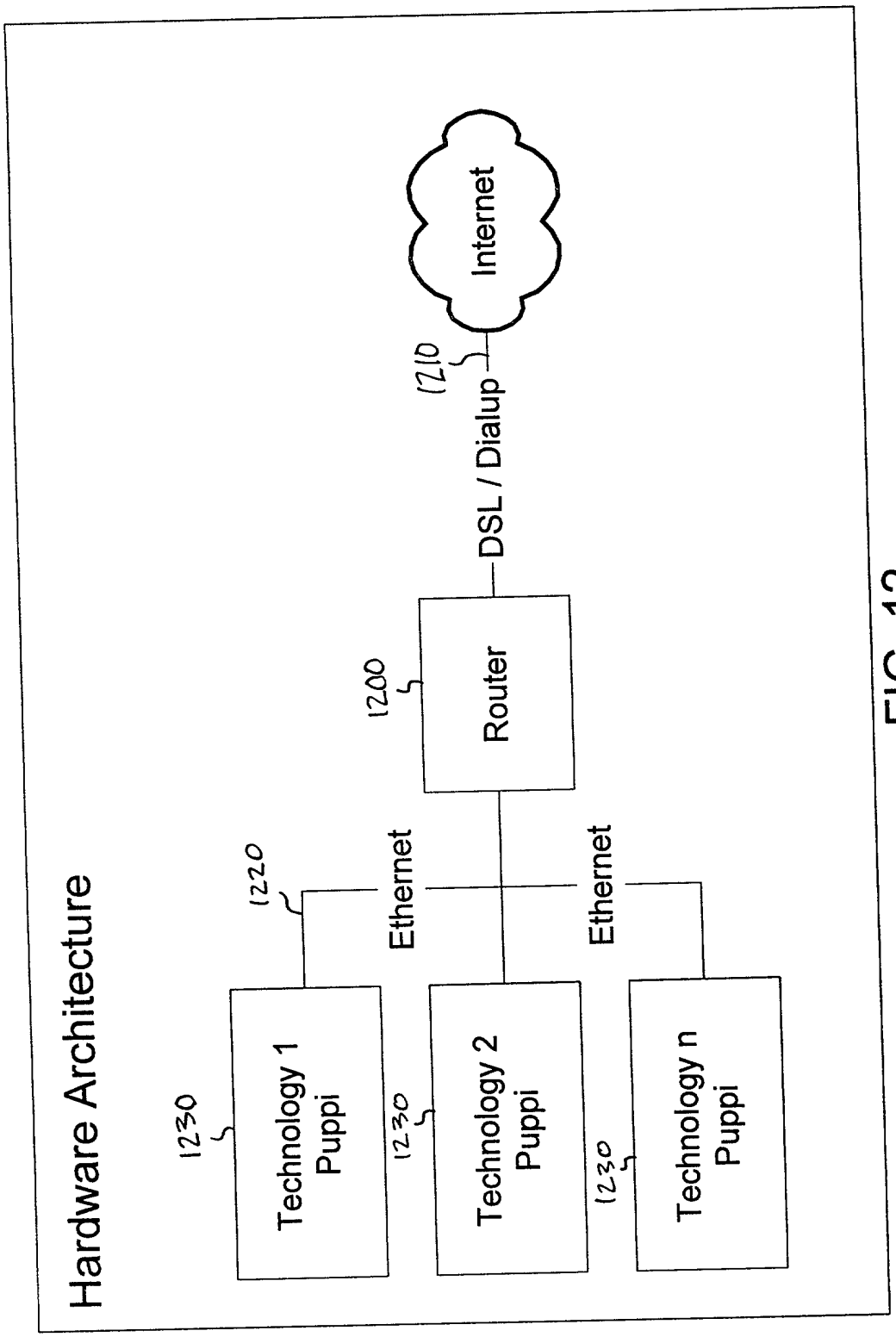
Hardware Architecture
Technology 1 Puppi
Technology 2 Puppi
Technology n Puppi
1230
1230
1230
1220
Ethernet
Ethernet
Router
1200
DSL / Dialup
1210
Internet

FIG. 12

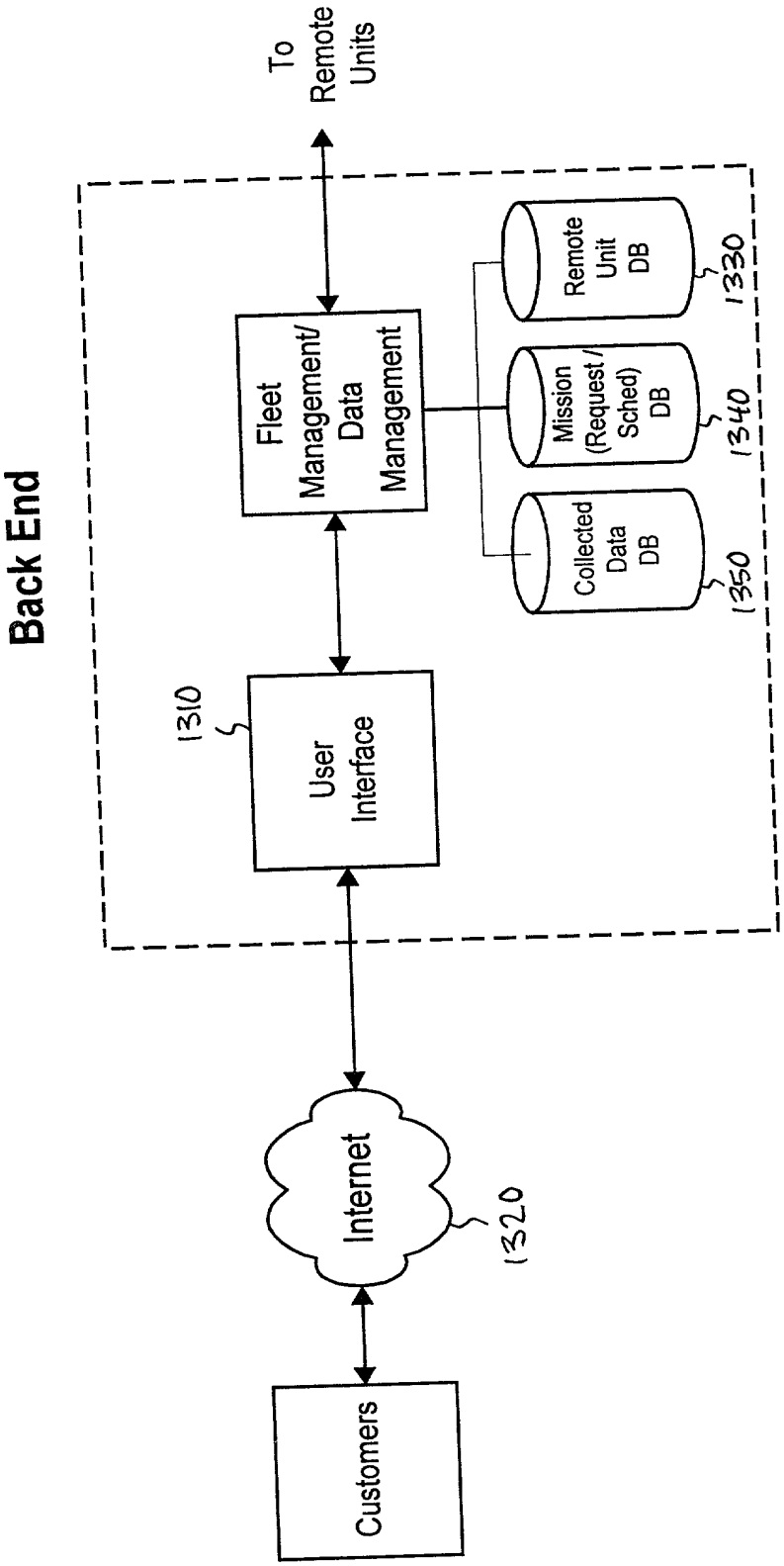
Back End
To Remote Units
Fleet Management/ Data Management
Remote Unit DB
1330
Mission (Request / Sched) DB
1340
Collected Data DB
1350
1310
User Interface
Internet
1320
Customers

FIG. 13

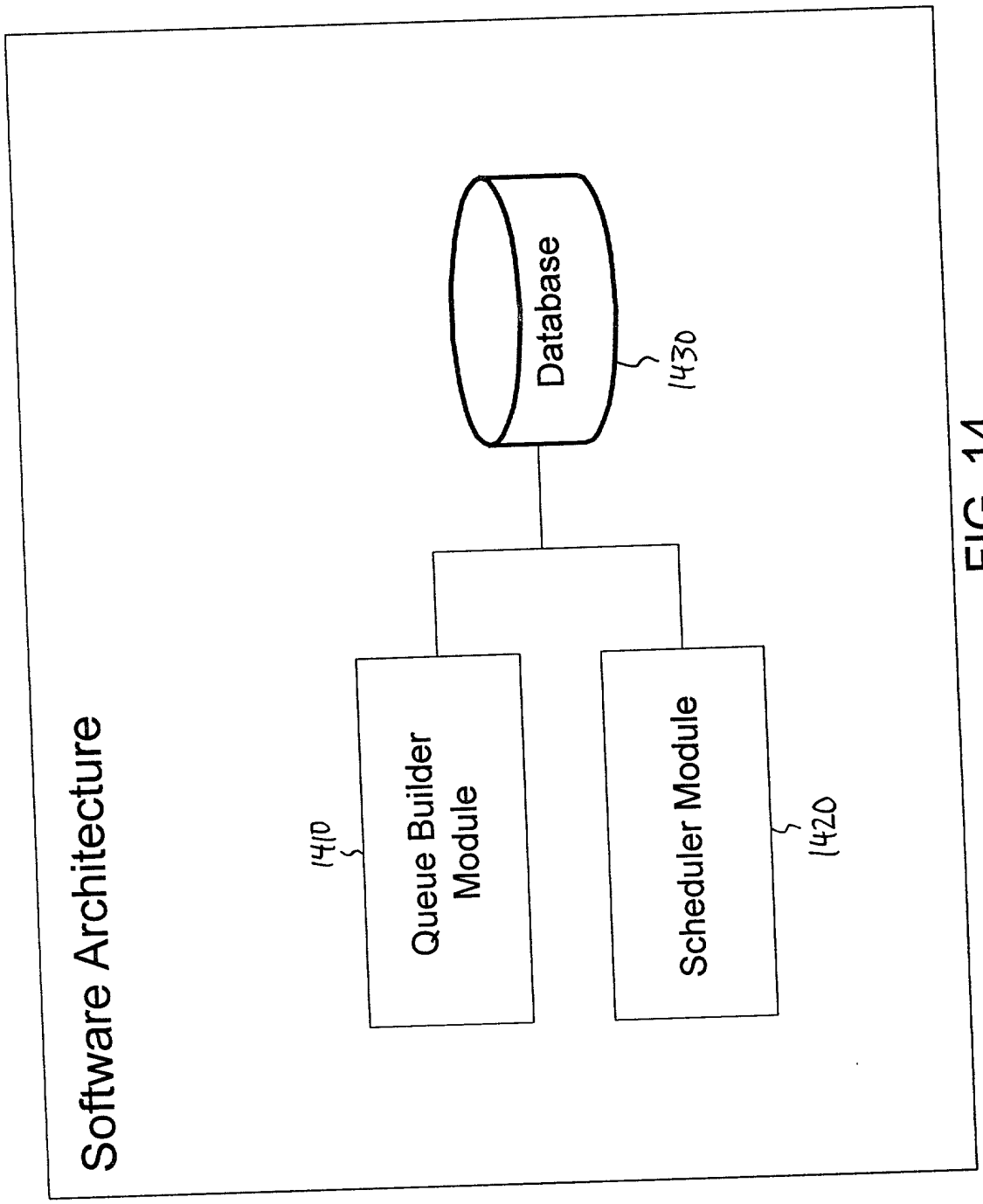
Software Architecture
Database
1430
Queue Builder Module
1410
Scheduler Module
1420

FIG. 14

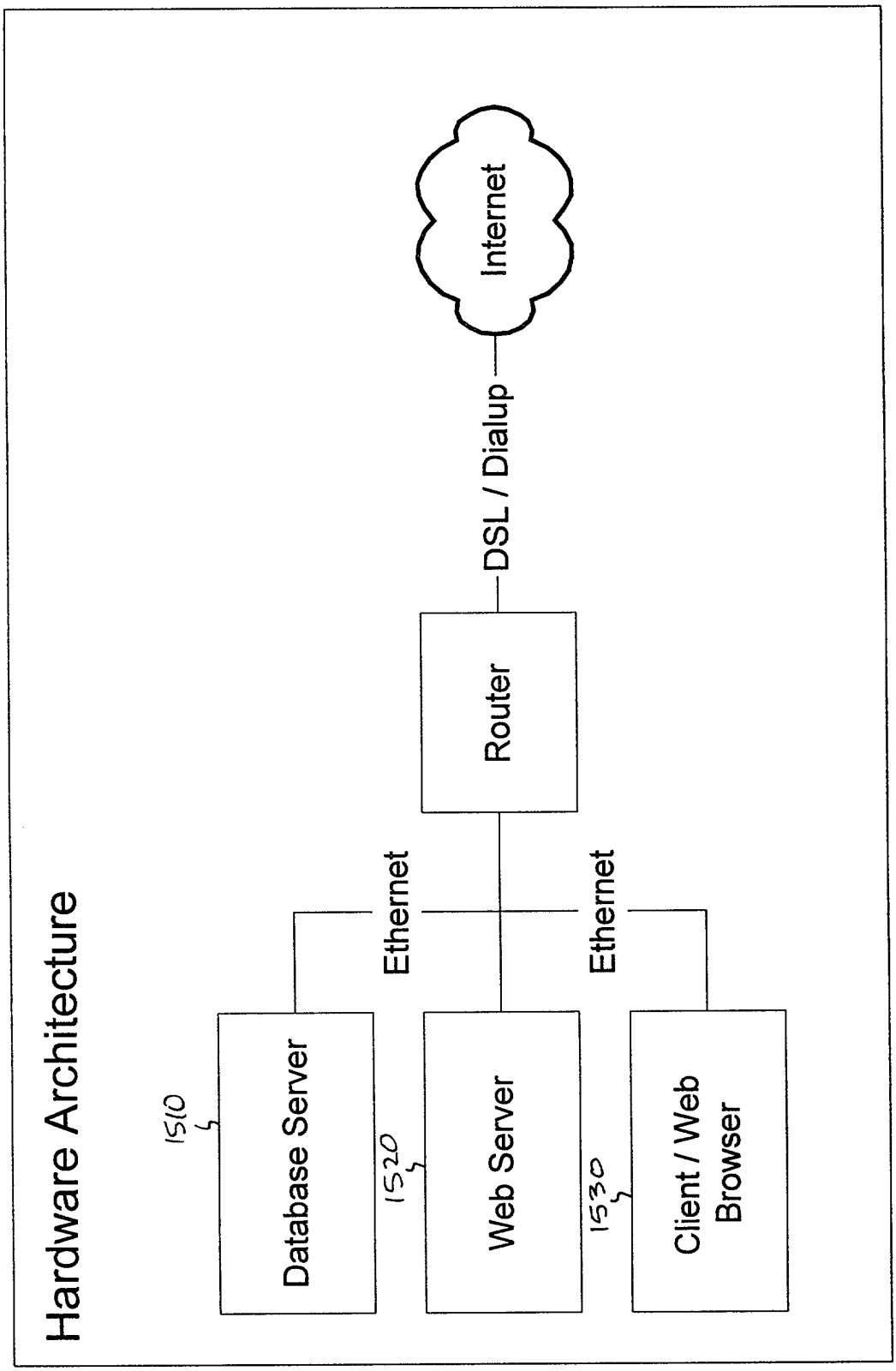
Hardware Architecture
Internet
DSL / Dialup
Router
Ethernet
Ethernet
1510
Database Server
1520
Web Server
1530
Client / Web Browser

FIG. 15